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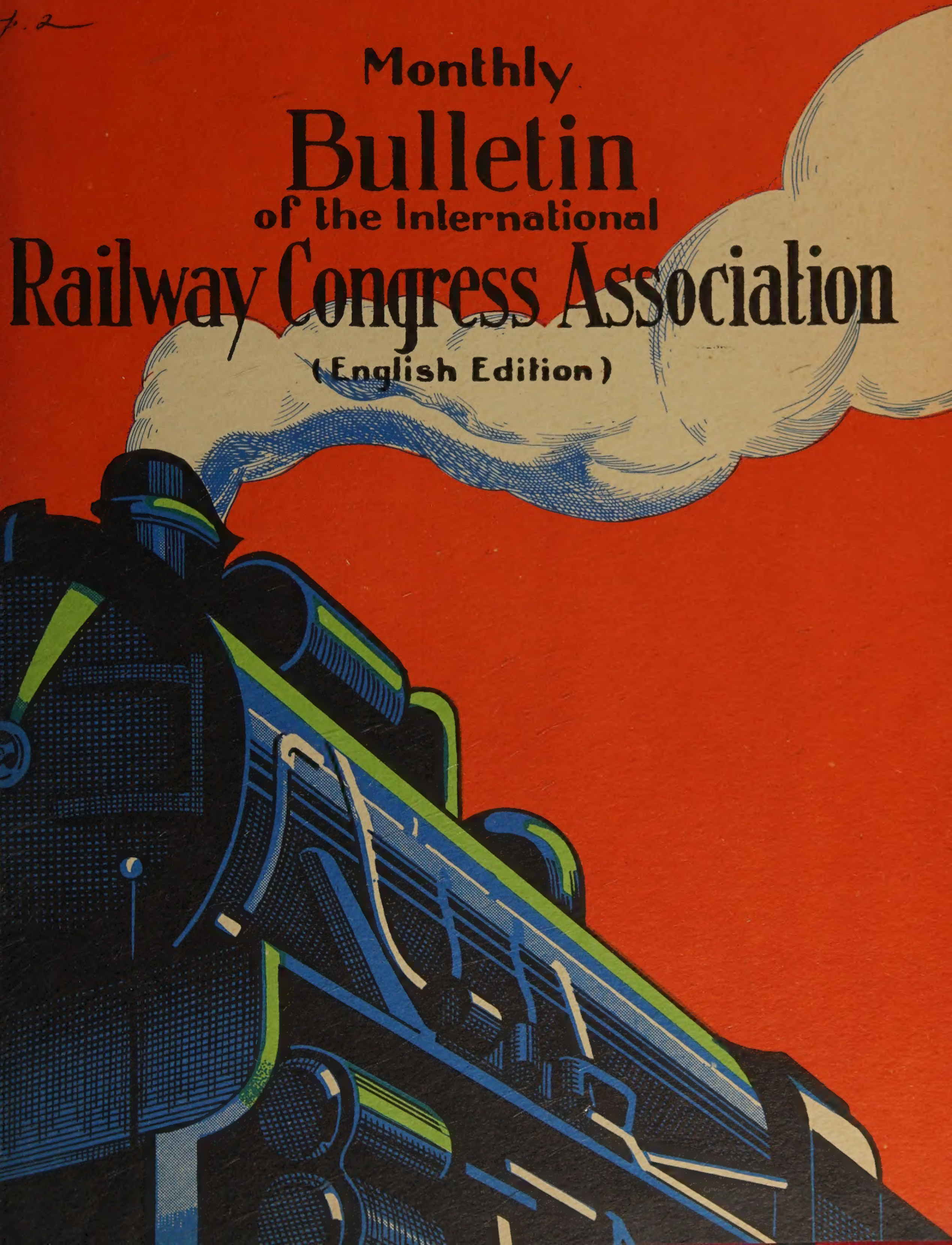
VOL. XXXVII. — No. 11. NOVEMBER 1960.

Monthly Bulletin of the International Railway Congress Association

(English Edition)



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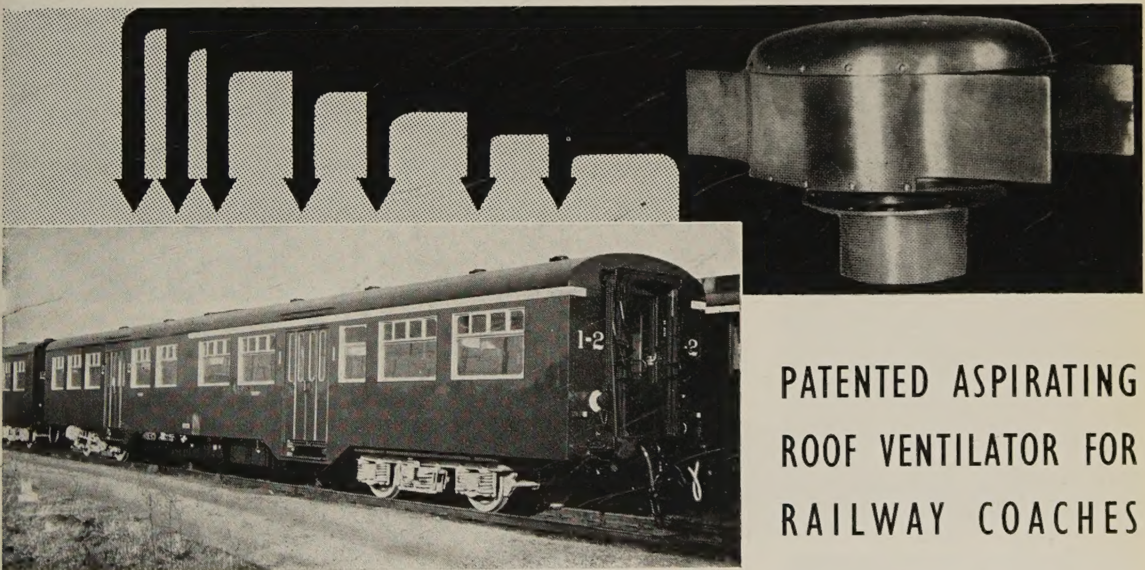

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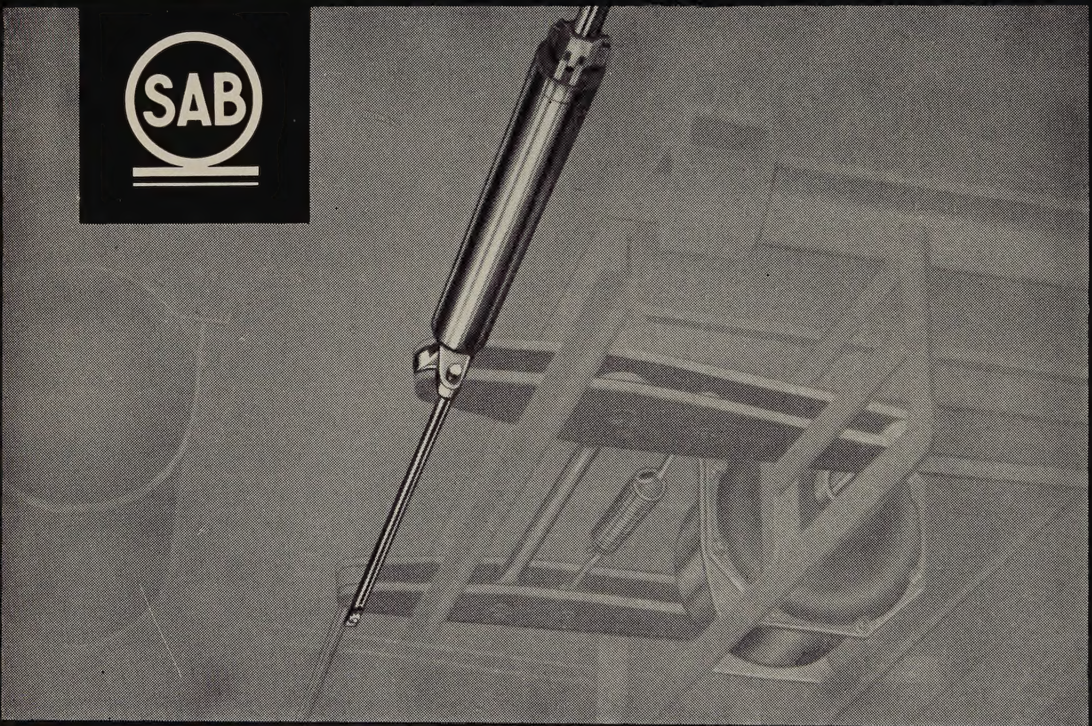

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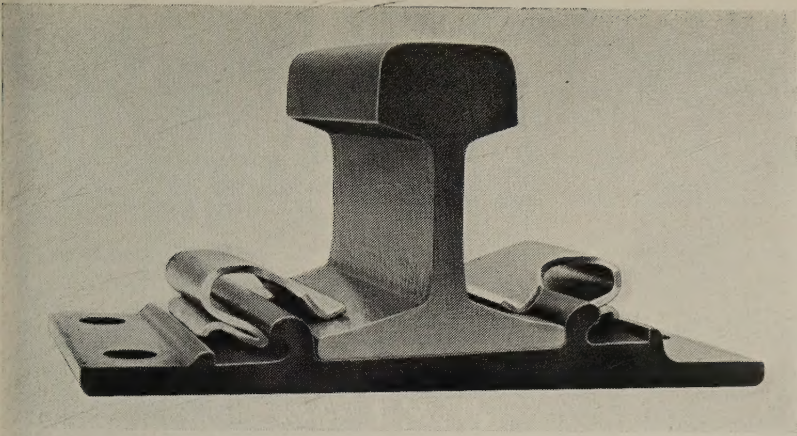

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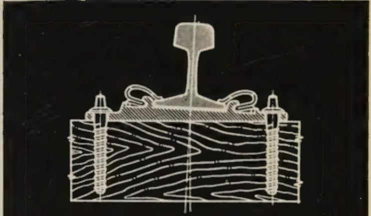
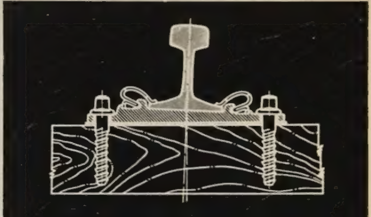
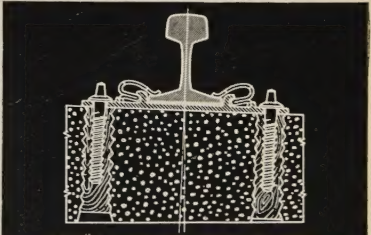


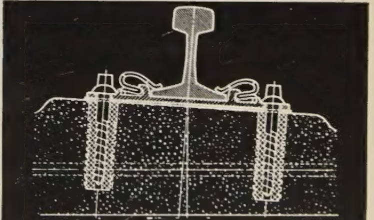
49 kg/m rails – wooden sleepers, Norwegian State Railways



109 lb./yard rails – wooden sleepers British Railways



49 kg/m rails – concrete sleepers, Norwegian State Railways



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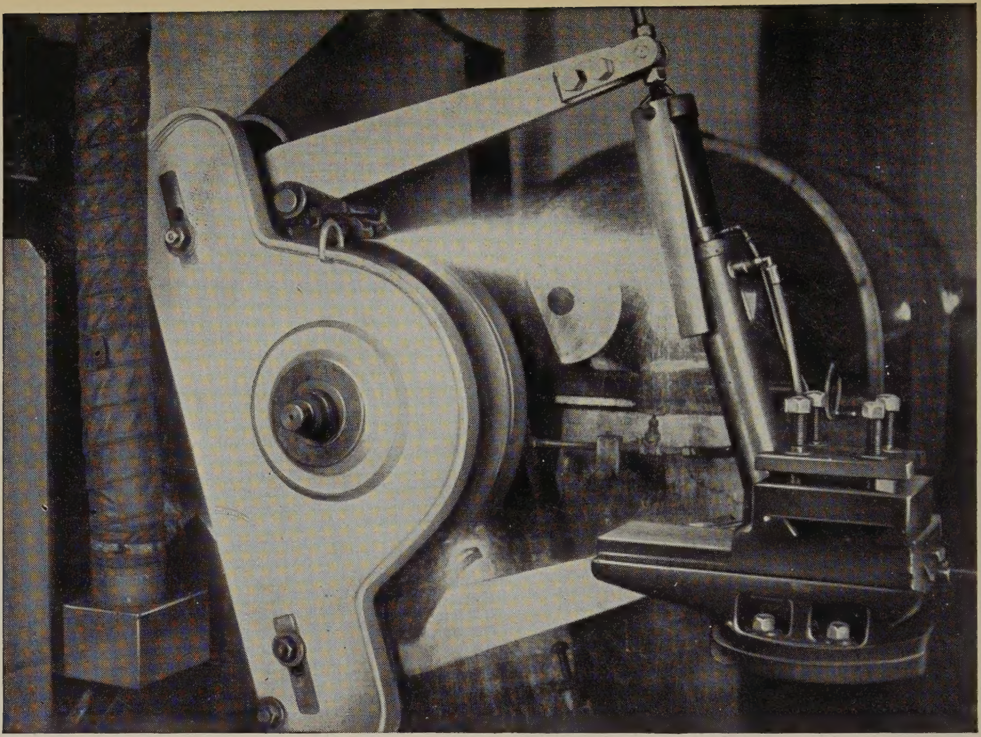

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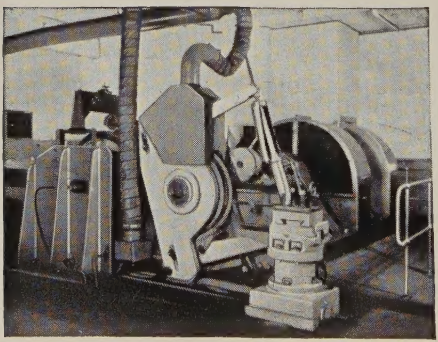

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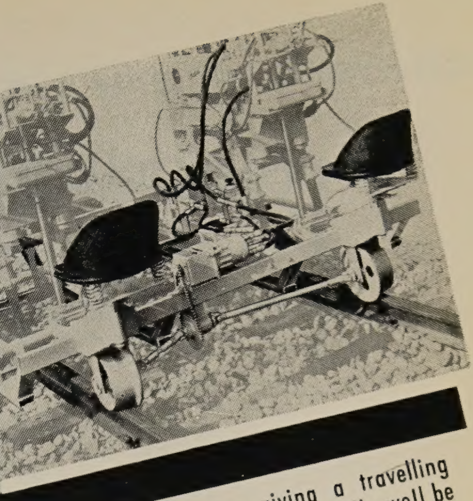

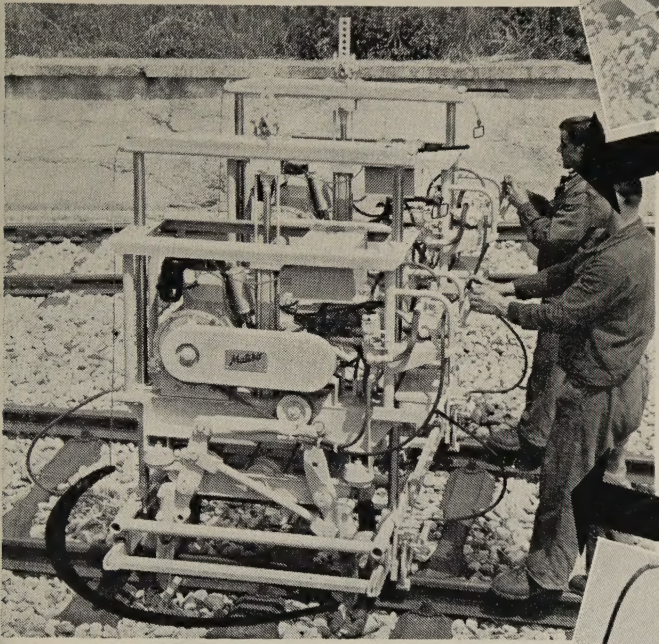

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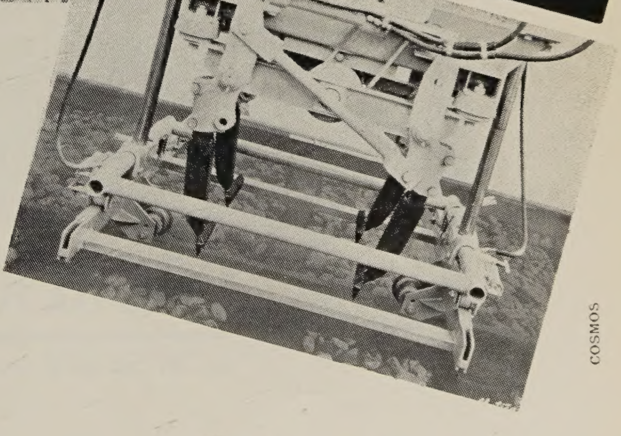

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Bulletin of the International Railway Congress Association

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1960 **385** (06 .111

Bull. of the Int. Ry. Cong. Ass., No. 11, November, p. 877.

ENLARGED MEETING OF THE PERMANENT COMMISSION IN BRUSSELS (27th to 29th June, 1960).

Official Information issued by the Permanent Commission of the International Railway Congress Association. — **Meetings of the Permanent Commission in Brussels** (27th to 29th June 1960). (*Appendix 1* : List of members of the Permanent Commission. — *Appendix 2* : List of participants. — *Appendix 3* : List of questions on the agenda of the 18th Session.) (8 000 words).

1960 **656** .25; **656** .225; **385** .58

Bull. of the Int. Ry. Cong. Ass., No. 11, November, p. 902.

ENLARGED MEETING OF THE PERMANENT COMMISSION IN BRUSSELS (27th to 29th June 1960).

Summary of sectional proceedings : *Question 1* : The effect of electric traction on signalling and communication circuits, in particular reference to the means of overcoming interference, to provide safety and good communications. — *Question 3* : Transport on railway wagons of road-lorries and trailers loaded with goods. Questions arising from this mode of transport : the role of the road-hauliers : tariffs to be applied; characteristics of the railway rolling stock to be employed; installations for loading and unloading; use of single wagons, or of sets of wagons, or of complete trains for this kind of transport. Results already obtained and possibilities of extending this mode of transport. — *Question 4* : What steps can be taken to develop and maintain co-operation between management and staff to improve productivity ? What scope is there for work study and incentive schemes? (20 000 words.)

1960 **656** .25; **656** .225; **385** .58

Bull. of the Int. Ry. Cong. Ass., No. 11, November, p. 946.

ENLARGED MEETING OF THE PERMANENT COMMISSION IN BRUSSELS (27th to 29th June 1960).

Proceedings of the Plenary Meeting held on the 29th Juue 1960. (*Appendix* : Final Summaries : Questions 1, 3 and 4). (6 000 words.)

1960 **385** (09 .2

Bull. of the Int. Ry. Cong. Ass., No. 11, November, p. 961.

OBITUARY. — Jean GOURSAT. (800 words & portrait.)

Note. — This contents sheet is appended to the BULLETIN

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OF THE
INTERNATIONAL RAILWAY CONGRESS ASSOCIATION
(ENGLISH EDITION)

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19, rue du Beau-Site, Brussels (**Telephone No. 47.53.35**).

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LIBRARY
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Permanent Commission of the International Railway Congress Association

READING ROOM : 19, rue du Beau-Site, Brussels.

Works in connection with railway matters, which are presented to the Permanent Commission are mentioned in the « Bulletin ». They are filed and placed in the library. If the Executive Committee deems it advisable they are made the subject of a special notice. Books and publications placed in the reading room may be consulted by any person in possession of an introduction delivered by a member of the Association.

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The Permanent Commission of the Association is not responsible for the opinions expressed in the articles published in the « Bulletin ».

An edition in French is also published.

Vol. XXXVII. — No. 11. November 1960.

BULLETIN
OF THE
INTERNATIONAL RAILWAY CONGRESS
ASSOCIATION
(ENGLISH EDITION)

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

Enlarged Meeting of the Permanent Commission in Brussels

(27th to 29th June, 1960).

On the occasion of the 75th anniversary of the foundation of the International Railway Congress Association, a number of technical meetings were held by the Permanent Commission in Brussels in the time from 27th to 29th June, 1960. These meetings were attended not only by most of the Members of the Commission but also by numerous engineers and high officials of the major railway administrations, assistants of these Members.

The programme of the technical sessions comprised the study of the following three Questions :

1. « The effect of electric traction on signalling and communication circuits, in particular reference to the means of overcoming interference, to provide safety and good communications. »

2. « Transport on railway wagons of road-lorries and trailers loaded with goods. Questions arising from this mode of transport : the role of the road-hauliers; tariffs to be applied; characteristics of the railway rolling stock to be employed; installations for loading and unloading; use of single wagons, or of sets of wagons, or of complete trains for this kind of transport. Results already obtained and possibilities of extending this mode of transport. »

3. « What steps can be taken to develop and maintain co-operation between management and staff to improve productivity. What scope is there for work study and incentive schemes ?

The study of these Questions had been decided upon at the meeting of the Permanent Commission on 7th March, 1959.

The list shown in Appendix 2, on pages 894 to 899 of the present *Bulletin*, gives the names of the Members of the Permanent Commission and their assistants who had been delegated for the technical meetings.

[385 (06 .111]

OFFICIAL INFORMATION

ISSUED BY THE

PERMANENT COMMISSION

OF THE

International Railway Congress Association.

MEETINGS OF THE PERMANENT COMMISSION IN BRUSSELS (27th to 29th June, 1960).

A first meeting of the Permanent Commission was held on 27th June, 1960, at the « *Palais des Congrès* », Brussels.

The meeting, opened at 9.30 a.m., was presided over by Mr. M. DE VOS, *General Manager of the Belgian National Railways*, and *President of the Association.*

Having welcomed the numerous personalities present, the PRESIDENT passed on to the Agenda.

He asked for the approval of the Minutes of the meeting of 12th March, 1960. These were approved by the Assembly.

The PRESIDENT then stated that the *Japanese National Railways* had asked for a second seat at the Permanent Commission. In view of the importance of the Japanese railway system, which covers over 12 000 miles, it was proposed to comply with this request.

— *This proposal was approved.*

Mr. GHILAIN, *General Secretary*, then reported about the changes in the composition of the Permanent Commission which had occurred since the meeting of 12th March, 1960, and submitted the following proposals for nominations :

Mr. Karnail SINGH, Chairman of the Railway Board of India, in lieu of his predecessor, Mr. K.B. MATHUR, who had been assigned to other duties.

Mr. Shinji SOGO, President of the Japanese National Railways, designated by his administration to occupy the second seat at the Commission, allotted to Japan.

The *General Secretary* also stated that Mr. P. GIOBBE, formerly « Directeur du Service du Personnel et des Affaires Générales », Italian State Railways, and Mr. E. ROSCIONI, formerly « Inspecteur Général Supérieur de la Motorisation Civile et des Transports Concédés », Italian Ministry of Transport, had retired.

At the suggestion of the Italian delegation, a proposal to prolong the mandate of these gentlemen until the Munich Congress (1962) was made the subject of a written ballot in accordance with

Article 6 of the Rules, and was unanimously favourable.

— *Approved.*

Appendix 1 shows the present composition of the Permanent Commission.

* * *

The *General Secretary* then informed the meeting of the intended composition of the Sectional Bureaus for the technical meetings on 27th, 28th and 29th June.

SECTION I

Way and Works.

President :

Mr. A. d'Arbela, Directeur Adjoint du Service du Matériel et de la Traction, Italian State Railways.

Vice-President :

Mr. E. Derijckere, Directeur du Service de l'Electricité et de la Signalisation, Belgian National Railways, Member of the Permanent Commission of the Association.

Reporters :

Prof. Dr. Ing. R. Righi, Directeur de l'Institut Expérimental, Italian State Railways *(Special Reporter)*;

Mr. J.A. Broughall, Electrical Engineer (Development), British Transport Commission, British Railways Division;

Mr. Sven Svensson, Electrical Engineer, Telecommunication, Kungl. Järnvägsstyrelsen, Sweden.

Principal Secretary :

Mr. P. Schoonjans, Ingénieur Principal, Belgian National Railways; Technical Secretary of the Association.

English Secretary :

Mr. A.E. Beresford, Engineer, British Railways, Eastern Region.

SECTION III

Working.

President :

Dr. F. Schelp, Mitglied des Vorstandes und Präsident der Deutschen Bundesbahn, Member of the Permanent Commission of the Association.

Vice-President :

Dr. M. Schantl, Directeur Général des Chemins de fer Fédéraux Autrichiens, Member of the Permanent Commission of the Association.

Reporters :

Mr. L. Lohier, Ingénieur en Chef, Chef adjoint de la Direction Commerciale, French National Railways *(Special Reporter)*.

Dr. G. Schrader, Bundesbahnoberrat in der Hauptverwaltung der Deutschen Bundesbahn.

Principal Secretary :

Mr. A. Marchal, Ingénieur Principal, Belgian National Railways.

English Secretary :

Mr. G. Pickering, British Railways, Office of the General Agent for Belgium and Luxemburg.

SECTION IV

General.

President :

Sir John BENSTEAD, Deputy Chairman of the British Transport Commission, Member of the Permanent Commission of the Association.

Vice-President :

Mr. R. GUIBERT, Directeur Général Adjoint, French National Railways, Member of the Permanent Commission of the Association.

Reporters :

Mr. Edgar J. LARKIN, Director of Work Study, British Transport Commission *(Special Reporter)*;

Mr. E.M. ARYS, Inspecteur Principal à la Direction du Personnel et des Services Sociaux, Belgian National Railways.

Principal Secretary :

Mr. W. VAN RIJN, Ingénieur Principal Belgian National Railways, Technical Secretary of the Association.

English Secretary :

Mr. S. CAHILL, Coras Iompair Eireann.

It was also proposed to designate Mr. J.L. HARRINGTON, Chief Shipping and International Services Officer of the British Railways, as Joint General Secretary (English).

— *Approved.*

* * *

The PRESIDENT recalled that the technical programme for the forthcoming *Munich Congress* (1962) will comprise ten Questions on subjects based on proposals submitted by the member administrations.

On the basis of these proposals, 15 Questions (3 per Section) had been drafted and submitted to the Executive Committee who had indicated their preference for 10 among them. The wording of the 15 Questions proposed would be submitted to the Members of the Permanent Commission for examination, and the final selection of the Questions would take place at the meeting of 29th June, two days later.

* * *

The PRESIDENT recalled that, at the last meeting of the Permanent Commission on 12th March 1960, it had been decided to carry out a more profound examination of the question of fixing the variable contribution rate for future years. He also recalled that the rate had been fixed at 0.28 Gold-Francs as from 1954 but that, since 1957, it had been decided to apply only 50% of this amount, i.e. 0.14 Gold-Francs, in order to reduce the reserves to a minimum.

The PRESIDENT stated that, after examining a detailed report on the financial situation of the Association, the Executive Committee had found that, in future years, the quota rate of 50% of the amount of the contribution at present applied would have to be increased, and had proposed to ask, for the financial year 1961, for contributions based on three-quarters of the original rate of 0.28 Gold-Francs, i.e. 0.21 Gold-Francs. As regards subsequent financial years, i.e. 1962 and later, the question should, in the opinion of the Executive Committee, again be reviewed during the first six months of 1961.

— *The Assembly signified their approval of these proposals.*

* * *

Mr. GHILAIN stated that, since the last meeting, the « *Office Central des Chemins de fer d'Outre-Mer* », Paris, had been registered as an affiliated organisation. This body comprised the railways of : *Dakar-Niger*, *Abidjan-Niger*, *Benin-Niger*, *Congo-Océan*, *Madagascar*, *Cambodia*, *Cameroon* and *Togo*, with a total kilometrage of 8 621 km.

On the other hand, the « *Chemins de fer Economiques du Nord-France* » (121 km) and the *Tasmanian Railways* (930 km) had resigned.

After these changes, the Association comprised at present 34 Governments, 12 Organisations and 101 Railway Administrations with a total mileage of 601 700 km (approx. 374 000 miles).

The PRESIDENT then submitted to the Assembly the following nominations for *Technical Secretaries of the Association :*

Mr. A. JACOPS, Senior Engineer, Belgian National Railways, to replace Mr. J. DUBUS, deceased;

Mr. VAN RIJN, Senior Engineer, Belgian National Railways, to replace Mr. R. SQUILBIN, appointed Assistant to the General Secretary;

Mr. H.A. VERBEECK, Senior Engineer, Belgian National Railways, to replace Mr. F. BAEYENS.

— *These nominations were approved by the Assembly.*

The meeting was concluded by a report on the financial situation of the Association.

— The meeting was closed at 10.30 a.m.

* * *

MEETING OF THE PERMANENT COMMISSION ON 29th JUNE, 1960

— The meeting, held at the « *Palais des Congrès* », was opened at 10 a.m., Mr. M. DE VOS, *President of the Association*, being in the Chair.

The PRESIDENT recalled that, at the meeting on 27th June, 1960, it had been decided to undertake, at the present meeting, the final selection of the Questions to be discussed at the Munich Congress.

— *The wording of the 15 Questions adopted by the Executive Committee had meanwhile been communicated to the Members of the Permanent Commission.*

These texts were the subject of numerous and interesting exchanges of views as the proposed Questions were discussed one by one, and the Assembly finally decided to adopt the ten Questions (two per Section) listed in *Appendix 3*, pages 900 and 901.

* * *

The PRESIDENT proposed that the Chairmanship of the Sections at the Munich Congress should be entrusted to the following countries :

SECTION I : *Germany.*
SECTION II : *Italy.*

SECTION III : *France.*
SECTION IV : *Great Britain.*
SECTION V : *Sweden.*

— *These proposals were unanimously accepted.*

* * *

The PRESIDENT then discussed the proposed allocation of the Reports among the countries affiliated, and this was approved by the Assembly.

The session ended at 11.45 a.m.

The General Secretary	*The President*
(s) P. GHILAIN	(s) M. DE VOS.

* * *

The technical sessions of Section III took place at the « *Palais des Congrès* », and those of Sections I and IV at the « *Hôtel Ravenstein* ».

The solemn Inauguration Session took place at the « *Palais des Académies* » on Monday, 27th June, at 11.15 a.m. It was enhanced by the presence of His Royal Highness, *Prince Albert of Liège*, and His Excellency, the Minister of Communications, Mr. SEGERS.

Mr. DE VOS, *President of the Association*, having declared the Brussels Meeting open, gave the following address :

« Your Royal Highness,

« The interest taken by your Royal Highness in railway matters is of long standing, and Belgian railwaymen remember with justified pride the many days, devoted by your Highness to the detailed study of the organisation of their network, the technical problems of railway operation, the influence of railway transport on the economic life of the country, and the realisation of modernisation programmes - programmes which were designed to improve the services rendered to railway users by further enhancing the comfort, speed and regularity of travel, not to forget the safety of travel which is already virtually absolute, all this being accompanied by significant reductions in working expenses. »

« In honouring our solemn Opening Session by your august presence, Your Royal Highness have once more manifested your active sympathy for a means of transport intimately linked with the prosperity and well-being of the peoples. Our sittings are international in character. Experts from 25 countries, belonging to several continents, have answered the call and are taking an active part in our work here in Brussels. When they return home, they will not fail to relate the honour which the Dynasty, in the person of the Prince of Liège, has seen fit to bestow on our institution on the occasion of the 75th anniversary of its foundation.

« Would your Royal Highness please accept the expression of our deep gratitude.

« Your Excellencies, the Ministers »,

« May I be permitted to say how greatly honoured we are to find you among us to-day. But we are not only honoured - we are also greatly encouraged, as you are thus giving us a precious token of esteem. We are convinced that the contact which you have made with us will enable you to appreciate even more the spirit which, from across the borders, unites the members of our organisation of inveterate workers whose constant preoccupation is to serve.

« Your Royal Highness,

« Your Excellencies,

« Ladies and Gentlemen,

« In 1885, Belgium celebrated the fiftieth anniversary of the opening of her first railway.

« To mark this event in an enduring manner, it was decided to unite, on an international level, in the form of a Scientific Congress, the delegates of the Governments and of the principal Railway Administrations in order to exchange experience which each of them had acquired, to draw the lessons from the past, and to guide the technical development of the future.

« Impressed by the effectiveness of such pooling of knowledge, the persons taking part agreed to meet periodically and to create, in Brussels, a permanent centre for the purpose of maintaining contact and organizing the future meetings.

« The International Railway Congress Association, then admittedly under a different name, had come to life. The permanent centre, now known as the « Permanent Commission », soon went to work, and the first Rules were adopted at the Milan Congress in 1887.

« In spite of two interruptions of 12 and 10 years, respectively, due to the two wars and their aftermaths, the Congress has held 16 Plenary Sessions and 6 Intermediate Sessions, on a reduced scale.

« The meetings took place, in some cases more than once, in the following cities, here given in alphabetical order : Berne, Brussels, Cairo, Lisbon, London, Lucerne, Madrid, Milan, New Delhi, Paris, Rome, St. Petersburg, Scheveningen, Stockholm and Washington.

« 34 Governments, 10 Organisations and 101 Railway Administrations, in all the five continents, are affiliated to the Association, representing a railway network totalling 601 700 route km.

« 1885 to 1960 — The Congress now exists for 75 years, and as in 1935, when the 50th anniversary was celebrated, this event is again celebrated in Brussels where the Association was born. This, Ladies and Gentlemen, is for me a pleasant occasion to express to you my warmest wishes for fruitful work and an agreeable stay in Belgium.

« Between the memorable session in Madrid in the late summer of 1958 and that of Munich which is to take place in 1962, four Questions have been placed on the Agenda of studies to be undertaken by the Enlarged Permanent Commission.

« The second of these Questions has already been dealt with. It concerns the problems raised by the conception of polycurrent motive power units. In dealing with this subject, the experts from the different countries have taken into account the types at present in existence, and the practical experience gathered with these types, in order to formulate suggestions bearing on their future development.

« That was the purpose of the meeting held at New Delhi in December, 1959.

« I am certain to express the unanimous opinion of all those who took part in the Intermediate Session at India's capital city, if I once more pay a resounding tribute to the Government of India and to our Indian colleagues for the exemplary manner in which they organized the meetings, for the results obtained, and for the exquisite hospitality accorded to the guests of their vast country.

« Also, I should like, once more, to express our full admiration for their audacious new works, for the competence of their engineers, for the Five-Year-Plans prepared by their leaders.

« By the side of the historic relics of one of the oldest civilisations in the world, we were greatly impressed to find the manifestations of a resolutely modern spirit of enterprise in which the care for social welfare is harmoniously combined with the vanguard of technical progress.

« We saw the amazing spectacle of a nation which, though several thousand years old, was bubbling over with the spirit of youth. »

* * *

« We are now ready to tackle the three other Questions :

« SECTION I. — **Way and Works,** will analyze the effects of electric traction on signalling and communication circuits, as well as the means used, or recommended, for overcoming interference so as to avoid a deterioration of safety standards and to ensure good communications.

« SECTION III. — **Working,** will deal with a particularly interesting subject which is destined to bring about a felicitous and practical solution to an important aspect of the indispensable co-ordination between rail and road.

« This is the transport on railway wagons of road vehicles carrying goods.

« Here, it is necessary to define the part to be played by road transport, the tariffs to be applied, the characteristics of the railway rolling stock to be used, the loading and unloading installations, the use of single wagons, or strings of wagons, or complete trains.

« At the Brussels Exhibition already, the principal types of road-rail vehicles were demonstrated to visitors, and were seen in action. Since then, further experience has been gathered. We shall record the results obtained, and the possibilities of extending this type of transport.

« SECTION IV. — **General,** has quite a different mission — a mission of special interest because of its repercussions on the field of human relations. What steps can be taken to develop and maintain co-operation between management and staff in order to improve productivity ?

« What scope is there for work study and for incentive bonus schemes ?

« To create an atmosphere of confidence, to consult the staff representatives, to ensure security of employment, to take an interest in staff welfare, to organize professional training, to provide clearly defined promotional prospects, to be responsive to suggestions made by the staff, to encourage the exchange of information in regard to productivity, and finally, to adopt financial incentives.

« As I have said, we are now ready to tackle these three questions, which means that thorough preliminary work has already been carried out. Each of these questions has been the subject of two Reports, compiled after consultations with all the Administrations, divided into two groups. These two Reports reflect the opinion of the majority of the world's railways and have in each case, been condensed in a Special Report. We thus have a Special Report for each of the three Questions.

« It is my pleasant duty to pay public tribute to the Administrations which have assisted us with such brotherly helpfulness, as well as to the Reporters and Special Reporters. They have accomplished a formidable task, and have covered the ground completely. We can thus be sure that the exchanges of views will be orderly and methodical, and we look forward with absolute confidence to their results. They cannot fail to be substantial.

* * *

« In the course of your stay with us, and complementary to the studies which you are going to undertake, we shall arrange for you to visit our great national port, and important factories, and we shall endeavour to let you enjoy some moments of relaxation when, making the most of your travels, you will be shown some characteristic corners of our country, and some of her artistic and natural beauties.

« It is our ardent wish that you should feel at home with us — for that is what you are. We have no other desire but to be agreeable to you, and if you should have any wish, will you please do us the favour and kindness to give expression to it.

« May you take from your travels through Belgium the memory of a fraternal reunion where, as in all our gatherings, professional enrichment is accompanied by that human touch without which nothing is really great. »

M. SEGERS, *Minister of Communications*, then gave the following address :

« Your Royal Highness,

« Your Highness will allow me to associate myself with the words of respectful gratitude which have been addressed to you by the President of the Permanent Commission of the International Railway Congress Association.

« The present session is invested with a particularly solemn character as it coincides with the 75th anniversary of the creation of the Congress.

« By agreeing to be present at this Opening Session, your Royal Highness have bestowed on it an exceptional lustre, and have once more borne witness to the interest which your Highness are taking in the development of transport techniques.

« My dear Colleagues,

« Ladies and Gentlemen,

« Belgium is fully alive to the honour accorded to her by the eminent delegates from numerous friendly countries, in that they are meeting on our soil in order to bring their work to a successful conclusion.

« It is with all my heart that I tell them, in the name of the Government, that they are welcome, and that I wish them a pleasant stay in our country and a full success in concluding their studies for which they have been called together and which are to-day opened under such happy auspices.

« Your President has summed up the items which are on your agenda. I shall therefore not repeat them. But I should like to emphasize that two of these items have a more than technical significance as they extend, from the exclusive sphere of railways, to the sectors of road transport and social welfare, respectively.

« I note with genuine satisfaction that you are aiming at a close association of road and rail. You envisage, in fact, the development of devices which are able to make use, at one and the *same time*, of the flexibility of the motor vehicle, and of the low cost and high power of railway haulage. Moreover, you intend to give the road hauliers an interest in this mode of transport. With a farsightedness which deserves our full support, you are thus taking a decisive step in the direction of transport co-ordination.

« As regards item 4, the problem of co-operation between management and staff, though of particular interest to the railways, is by no means confined to this sphere. It is, on the contrary, of general importance and is encountered in all undertakings.

« But it is comforting to note that the leaders of the greatest community of employers in the world are clearly conscious of the importance of the *human element* in the exercise of their activities.

* * *

« But now, Gentlemen, you must bear with me if I depart, for a moment, from the immediate objective of your work. The presence, in Brussels, of so many leading international people provides me with an opportunity to approach with frankness the important questions confronting those responsible for good railway management. In raising these questions, we think more particularly of networks such as that of Belgium which is still among the densest networks of Europe, and indeed of the world.

« The reality of the present situation is that we must, on the one hand, undertake considerable investments in order to keep the railways in the forefront of progress. We must, in this respect, have a clear vision of the economic and social needs for which the speed, the regularity, and the capacity of railway transport still provide the highest trumps.

« But we must, on the other hand, eliminate numerous sections of lines which have become useless, and which only squander our substance.

« In this task, we need the support of public opinion, and have to struggle against two tendencies :

« Firstly, there are those who allege that railway transport is outdated, and is destined to disappear, so that any investments made in this sphere would be wasted.

« Secondly, there are those others who are up in arms against any decision to amputate dead branch lines.

« The railway would be obsolete... ? But we all know that the railway is indispensable for transport in bulk at the lowest cost and under the best conditions of regularity, safety and speed.

« A train with 1 000 passengers can be hauled by a single locomotive at an average speed of more than 100 km per hour. To carry the same traffic, at the same average speed, by road would require 250 motor cars using the motorways, provided that these are not congested.

« And what would be the situation if the ten thousands of passengers now entering the large centres by rail would, instead, swell the traffic on the roads ? To watch, from close quarters, the torrents of peak hour traffic, at, e.g. Saint-Lazare

Station in Paris or, for that matter, at Brussels Central Station would be enough to gain an idea of the congestion which would be experienced on the roads if all these people were to use them instead.

« As to goods traffic, uninterrupted files of lorries go along the main roads while, at the same time, thousands of wagons leave the marshalling yards.

« Imagine for a moment the gigantic traffic jams which would be produced if the loads of these railway wagons were carried by lorries in portions of 20 tons.

* * *

« The other tendency encountered at present is this : There is a kind of railway fetishism, often provoked by parochialism, which consists in wishing to preserve, against all reasonable judgment, every single railway line, no matter which.

« Quite a few railway links, generally over short distances or serving areas with small populations, were required at the time when the motor car was not yet in existence. To-day, their traffic can be carried more practically and more economically by road. There should be no hesitation in eliminating these lines and replacing them by lorries and buses; but it is necessary to convince those who, wrongly, feel that their interests are harmed.

« In short, we must fight on two fronts :

« We must first of all, fight *against the defeatists* by showing them not only that the railways are very much alive but also that their disappearance would be a *calamity* and that it is therefore necessary to permit judicious investments required for their modernisation.

« In this connection, it is necessary to make a resolute effort to perfect the substructure and also, above all, to renew the rolling stock, taking into account, in particular, the inescapable need for replacing steam traction by electric or diesel traction.

« The very elaborate studies to which your Association has already devoted its work show clearly that such investments have the effect of improving the service rendered while, at the same time, reducing costs.

« On the other hand, we must convince the over-zealous defenders of the railways that lines which have become useless constitute a costly burden which should be got rid off as a matter of urgency.

* * *

« But here, we are far removed from the subjects with which your are going to deal, and I should not like to claim your attention any longer.

Then continuing in English :

« Ladies and Gentlemen,

« I want to say once more that the Government is greatly pleased to welcome you. We are grateful to you, to have chosen Belgium as place of your meeting. May I repeat the ardent wish that my fellow-citizens, and the organizers are making for the successful issue of your proceedings. I hope you will find in our country every satisfaction you desire in the intellectual and artistic fields, as well as some time for relaxation.

« All of us, we shall endeavour to give you, in a very friendly way, an agreeable stay on the occasion of the seventy-fifth anniversary of your Association.

« Nowadays, transportation technology is quickly developing, and we know the effective contribution of your research to the progress of railway operation.

« For a long time already, railways have shown the way to international co-operation.

« I wish that your conclusions furthermore increase our common scientific inheritance. You may reckon upon our sympathy, and the Belgian railwaymen welcome you heartily.

* * *

« With the permission of His Royal Highness, Prince Albert, I now declare the Meeting of the Enlarged Permanent Commission of the International Railway Congress Association open. »

* * *

The PRESIDENT thanked the Minister of Communications for his interesting talk and adjourned the meeting.

* * *

The technical sessions commenced on Monday, 27th June at 2.30 p.m. The different Sections noted the Special Reports prepared for the three Questions on the agenda, and interesting discussions took place, in which the representatives of the principal railway administrations took part.

These meetings were resumed on the next day, 28th June, and the Summaries were discussed until they were ready to be submitted to the final approval of the Plenary Session of the Permanent Commision on Wednesday, 29th June.

This session took place at 11.15 a.m., and was attended by all the Members of the Permanent Commission present in Brussels.

The Assembly, under the Presidency of Mr. DE VOS, examined and discussed the proposals and summaries presented by the Secretariat of each of the three Sections, and final texts were unanimously approved.

The summaries are reproduced on pages 948 to 960 of the present *Bulletin.*

* * *

On the evening of Monday, 27th June, a reception was given by the Belgian Government, in the rooms of the « Musées Royaux d'Art et d'Histoire du Cinquantenaire », in honour of the persons taking part in the session and in commemoration of the 75th anniversary of the Association.

This reception was presided over by Mr. SEGERS, *Minister of Communications.* Numerous personalities of the Government and of the railway world were present.

During this reception, a folklore display recalling the days of the Court of Charles the Fifth, carried out lavishly and in a perfect manner by the « Société de l'Ommegang », took place in the Tapistry Room of the Museum, to the great delight of those present.

On Tuesday, 28th June, following a reception of the delegates by the City of Brussels authorities in the Town Hall, a Banquet was given by the Permanent Commission for the inviting Belgian authorities and for the Members of the Commission, under the Presidency of Mr. DE VOS, *President of the Association.*

On Wednesday, 29th June, while the ladies visited the splendid museum of Mariemont Castle where they admired the magnificent collections, the delegates were able to visit the ventilation plants of the North-South Junction line, the central control room at Brussels South station as well as the multicopying equipment of the S.N.C.B.

The participants were then taken to Mons where, after a visit to the town, a cold buffet was served in the outbuildings of the Waux-Hall Gardens.

On the following day, Thursday, 30th June, all the participants went to Antwerp by special train.

They had the opportunity to visit the port by means of the boat « La Pérouse ». During this trip, lunch was served on board. They were also able to visit the Rubens House, the Plantin-Moretus Museum, and the Cathedral. The excursion ended in the afternoon with a visit to the famous Zoological Gardens where tea was offered.

The two following days were devoted to visits to Liège and Ghent.

At Liège, the ladies were able to see the world-renowned Val-St.-Lambert Glassworks whilst the delegates visited some sections (Mechanical Engineering and Metallurgy) of the vast complex of the Cockerill-Ougrée works. Another party visited the city itself.

All were re-united at lunch at the « Maison des Congrès » where the many and exquisitely equipped rooms were the subject of general admiration.

The afternoon was devoted to a coach tour through the Ourthe and Amblève valleys. Tea was served at Spa, and the participants proceeded to Pepinster where a special train was waiting to take them back to Brussels.

At Ghent, on the next day, the members of the party visited St.-Bavon Cathedral where they were able to admire the famous polyptique of the Mystic Lamb, by the brothers Van Eyck.

Accompanied by guides well versed in the history of the town, they walked through the old parts of Ghent, admiring the typical views of the old dwelling and splendid monuments which make the city so charming.

Their perambulation ended with a visit to the « Béguinage ». They were then conducted to the Abbaye St.-Pierre where a candlelight lunch was prepared in the caves of the Abbey which were magnificently equipped for this purpose.

Whilst some members of the party then returned to Brussels, others visited the Musée de la Byloke where the collections of famous antiquities provided a special attraction.

Yet another group was taken to Bruges.

* * *

All these excursions, carefully organized by the S.N.C.B. with the devoted aid of the local or provincial authorities, left an indelible impression in the minds of those taking part, as is borne out by the numerous manifestations of satisfaction received from them.

Special mention must still be made of the activities of the Ladies Committee who, under the guidance of Mrs. De Vos, made a special effort to render the visit of the delegate's wives happy and pleasant.

List of Members of the Permanent Commission

OF THE

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

(JUNE 27, 1960.)

President :

M. **De Vos** (1), Directeur Général de la Société Nationale des Chemins de fer belges; 19, rue du Beau-Site, Bruxelles.

Vice-Presidents :

J. **Goursat** (2), Directeur de la Région du Nord de la Société Nationale des Chemins de fer français; 18, rue de Dunkerque, Paris (X^e);

M. **Crem** (2), Directeur du Service de l'Exploitation de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Bruxelles.

Members of the Executive Committee :

E. **Dorges** (1), Secrétaire Général Honoraire aux Travaux Publics et aux Transports, Délégué Général aux Affaires Internationales du Ministère des Travaux Publics, des Transports et du Tourisme; 244, boulevard Saint-Germain, Paris;

Sir John **Benstead** (2), Deputy Chairman of the British Transport Commission; 222, Marylebone Road, London, N.W.1;

Sir James **Dunnett** (3), Permanent Secretary, Ministry of Transport (Great Britain); Berkeley Square House, Berkeley Square, London, W.1.

Ex-presidents of session, members ex-officio :

D^r Ing. G. **di Raimondo,** Directeur Général des Chemins de fer italiens de l'Etat (*retired*); Rome;

Ibrahim Fahmy **Kerim**; Le Caire;

D^r W. **Meile,** ancien Président de la Direction générale des Chemins de fer fédéraux suisses; Brügglerweg, 11, Berne;

A. **Plana,** Sous-Secrétaire d'Etat aux Travaux Publics et Président du Conseil d'Administration du Réseau National des Chemins de fer espagnols; Madrid.

General Sir Brian **Robertson,** Bart., G.C.B., G.B.E., K.C.M.G., K.C.V.O., D.S.O., M.C., Chairman, British Transport Commission, 222, Marylebone Road, London, N.W.1.

Members :

E.T. **Aalto** (1), Directeur Général des Chemins de fer de l'Etat de Finlande; Helsinki;

Mohamed **Afifi** (1), Directeur Général des Chemins de fer de la République d'Egypte; Le Caire.

Dr. C.S. **Andrews** (1), Chairman of the Coras Iompair Eireann; Kingsbridge Station, Dublin;

Abdel Moneim **Azmy** (1), Sous-Secrétaire d'Etat au Ministère des Communications d'Egypte; Le Caire;

Sir John **Benstead** (already named);

R. **Besnard** (3), Chef de Service adjoint au Directeur général des Chemins de fer et des Transports, Ministère des Travaux publics, des Transports et du Tourisme; 244, boulevard Saint-Germain, Paris;

David **Blee** (1), General Manager, London Midland Region, British Railways; Euston Station, London, N.W.1;

Ing. F. **Boomstra** (1), Ingénieur en Chef au Ministère des Transports et du Waterstaat; La Haye;

Dr. H. **Born** (2), Directeur de l'Union d'Entreprises Suisses de Transport; Bundesgasse 28, Berne;

Dr. L. **Branca** (1), Vice-Directeur Général des Chemins de fer italiens de l'Etat; Rome.

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(1) Retires at the 18th session.
(2) Retires at the 19th session.
(3) Retires at the 20th session.

A. **Brouckaert** (3), Directeur du Service du Matériel et des Achats de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Bruxelles;

E. **Clarembaux** (1), Directeur du Service de la Voie de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Bruxelles;

M. **Crem** (already named);

G. **Csanadi** (2), Premier Adjoint du Ministre des Communications et des Postes (Hongrie); Budapest;

Dr Ing. A. **Cuttica** (1), Directeur Général Adjoint et Conseiller d'Administration des Chemins de fer italiens de l'Etat (*retired*); Rome;

Ph. **Dargeou** (1), Directeur Général de la Société Nationale des Chemins de fer français; 88, rue Saint-Lazare, Paris (IXe);

J. **de Aguinaga** (3), Directeur Adjoint du Réseau National des Chemins de fer espagnols; Madrid;

E. **Derijckere** (3), Directeur du Service de l'Electricité et de la Signalisation de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Bruxelles;

M. **De Vos** (already named);

M. **Dias Trigo** (2), Directeur des Services d'Exploitation et du Matériel de la Direction des Transports terrestres au Ministère des Communications du Portugal; Lisbonne;

Dr Ing. G. **di Raimondo** (already named);

E. **Dorges** (already named);

A.R. **Dunbar** (2), Manpower Adviser, British Transport Commission; 222, Marylebone Road, London N.W.1;

J.M. **Garcia-Lomas** (3), Vice-Président du Conseil d'Administration du Réseau National des Chemins de fer espagnols; Madrid;

H. **Geitmann** (1), Präsident der Deutschen Bundesbahn; Friedrich-Ebert-Anlage, 43-45, Frankfurt (Main);

Dr. Ing. P. **Giobbe** (1), Directeur du Service du Personnel et des Affaires Générales des Chemins de fer italiens de l'Etat (*retired*); Rome;

J. **Goursat** (already named);

K.W.C. **Grand** (3), Member, British Transport Commission ; 222, Marylebone Road, London, N.W.1;

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F. **Hebert** (3), Directeur Général Adjoint de la Société Nationale des Chemins de fer français; 88, rue Saint-Lazare, Paris (IXe);

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I.A. **Ivanov** (2), Candidat des Sciences Techniques, Directeur de l'Institut Scientifique des Chemins de fer de l'U.R.S.S.; Moscou;

M. **Jacobshagen** (3), Direktor bei der Hauptverwaltung der Deutschen Bundesbahn; Friedrich-Ebert-Anlage, 43-45, Frankfurt (Main);

Ibrahim Fahmy **Kerim** (already named);

Dr. Ing. Moustapha **Khalil** (2), Ministre des Communications d'Egypte; Le Caire;

A. **Kriz** (1), Ingénieur, Conseiller Supérieur de Section au Ministère des Communications de la République tchécoslovaque; Prague;

R. **Kunz** (3), Directeur de l'Office fédéral des transports; Berne;

Dr N. **Laloni** (2), ancien Directeur Général Adjoint des Chemins de fer italiens de l'Etat; Rome;

Brig. Ch.A. **Langley** (3), Chief Inspecting Officer of Railways, Ministry of Transport, Berkeley Square House, Berkeley Square, London, W.1;

J. **Lohmann** (2), Président des Chemins de fer Néerlandais, S.A.; Utrecht;

D.P. **Loomis** (1), President, Association of American Railroads; Transportation Building, Washington, 6. D.C.;

P. **Lorenzo Ochando** (3), Director General de Ferrocarriles, Tranvias y Transportes por Carretera; Madrid;

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(1) Retires at the 18th session.
(2) Retires at the 19th session.
(3) Retires at the 20th session.

W.H. **Maass** (1), Advisory Engineer to the High Commissioner for the Union of South Africa; South Africa House, Trafalgar Square, London, W.C.2.;

L.T. **Madnani** (3), Railway Adviser to the High Commissioner for India in London; Government Building, Bromyard Avenue, Acton, London, W.3.;

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Dr W. **Meile** (already named);

Ing. Z. **Modlinski** (3), Sous-Secrétaire d'Etat au Ministère des Communications de Pologne; Varsovie;

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Prof. Dr. jur. H.M. **Oeftering** (2), Vorsitzer des Vorstandes und Erster Präsident der Deutschen Bundesbahn; Friedrich-Ebert-Anlage, 43-45, Frankfurt (Main);

A. **Plana** (already named);

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Dr. Ing. S. **Rissone** (2), Directeur Général des Chemins de fer italiens de l'Etat; Rome;

General Sir Brian **Robertson** (already named);

Dr.-Ing. E. **Roscioni** (2), Inspecteur Général Supérieur de la Motorisation Civile et des Transports concédés au Ministère des Transports (Italie) (*retired*); Rome;

H. **Saito** (3), Directeur du Département Etranger aux Chemins de fer Nationaux du Japon; Chiyodaku Tokio;

Dj. **Savičevič** (3), Directeur Général Adjoint des Chemins de fer Yougoslaves; Belgrade;

Dr M. **Schantl** (1), Directeur Général des Chemins de fer fédéraux autrichiens; 9, Elisabethstrasse, Vienne I;

Dr. F. **Schelp** (1), Mitglied des Vorstandes und Präsident der Deutschen Bundesbahn; Friedrich-Ebert-Anlage, 43-45, Frankfurt (Main);

H.E. **Simpson** (2), President, Baltimore and Ohio Railroad Company; Baltimore, Md.;

Karnail **Singh** (1), Chairman, Railway Board, Ministry of Railways, Government of India; New Delhi;

P.E.N. **Skov** (1), Directeur Général des Chemins de fer de l'Etat danois; 40, Sölvgade, Copenhague, K;

Shinji **Sogo** (3), Chairman of the Board of Directors, Japanese National Railways; Kokutetsu Building, Tokyo, Marunouchi;

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H.E. **Stokke** (3), Directeur Général des Chemins de fer de l'Etat norvégien; Oslo;

J. **Tuja** (2), Secrétaire Général de l'Union internationale des Chemins de fer; 10, rue de Prony, Paris;

E.G.J. **Upmark** (3), Directeur Général des Chemins de fer de l'Etat suédois; Stockholm;

R. **Vaubourdolle** (3), Directeur des Installations Fixes de la Société Nationale des Chemins de fer français; 42, rue de Châteaudun, Paris;

F. Perez **Villamil** (3), Directeur Adjoint du Réseau National des Chemins de fer espagnols; Madrid;

W. **White** (1), President, Delaware & Hudson Railroad Corporation; 230, Park Avenue, New York 17;

O. **Wichser** (2), Directeur Général, Chef du Département des Travaux et de l'Exploitation des Chemins de fer Fédéraux Suisses; Berne;

Dr. Ing. W. **Wyrzykowski** (2), Vice-Directeur de l'Institut Scientifique des Essais et des Recherches Ferroviaires des Chemins de fer de l'Etat Polonais; Varsovie;

N...... (3) Argentina.
N...... (1) Argentina.
N...... (2) Belgium.
N...... (3) Bulgaria.
N...... (3) China.
N...... (1) Egypt.
N...... (2) Great Britain.
N...... (3) Roumania.
N...... (3) Spain.
N...... (3) Switzerland.
N...... (2) U.S.A.

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(1) Retires at the 18th session.
(2) Retires at the 19th session.
(3) Retires at the 20th session.

Honorary President : F.H. **Delory**, Directeur Général honoraire de la Société Nationale des Chemins de fer belges; 2, avenue Curé Glibert, Rixensart.

Members of Honour : L. **Armand**, ancien Président du Conseil d'administration de la Société Nationale des Chemins de fer français; 88, rue Saint-Lazare, Paris (IX^{e})

O.V.S. **Bulleid**, former Chief Mechanical Engineer, Coras Iompair Eireann, and former Chief Mechanical Engineer, Southern Region, British Railways; St. Anthony's Close, Belstone, Devon.

P. **Ghilain**, Directeur honoraire du Service du Matériel et des Achats de la Société Nationale des Chemins de fer belges, Secrétaire Général de l'Association; 19, rue du Beau-Site, Bruxelles.

Ranald J. **Harvey**, Consulting Engineer; 34, Victoria Street, Westminster, London, S.W.1.

The Rt. Hon. Lord **Hurcomb**, G.C.B., K.B.E., Chairman, British Transport Commission 1947-53; 47, Campden Hill Court, Campden Hill Road, Kensington, London W. 8.

U. **Lamalle**, Directeur Général honoraire de la Société Nationale des Chemins de fer belges, professeur émérite de l'Université de Louvain; 27, rue de l'Aurore, Bruxelles.

SECRETARY'S OFFICE : 19, rue du Beau-Site, Brussels.

General Secretary : **P. Ghilain** (already named).

Assistant to the General Secretary : **R. Squilbin**, Senior Engineer, Belgian National Railways.

APPENDIX

LIST OF PARTICIPANTS

TO THE BRUSSELS MEETING.

* Members of the Permanent Commission.
** Assistants to members of the Permanent Commission.

* E. T. **Aalto,** General Manager, Finnish State Railways. *(Excused.)*

** T. P. **Elomaa,** Assistant Director, Chief of Transport Office, Finnish State Railways.

** A. A. **Kauppinen,** Chief of the Organization Office, Finnish State Railways.

* Dr. C. S. **Andrews,** Chairman of the Coras Iompair Eireann. *(Excused.)*

** D. **Herlihy,** Chief Engineer, Coras Iompair Eireann.

* Sir John **Benstead,** Deputy Chairman of the British Transport Commission.

** J. L. **Harrington,** Chief Shipping and International Services Officer, British Transport Commission.

* David **Blee,** General Manager, London Midland Region, British Railways.

** E. G. **Brentnall,** Signal Engineer, London Midland Region, British Railways.

* Ing. F. **Boomstra,** Ingénieur en Chef au Ministère des Transports et du Waterstaat (Pays-Bas).

* Dr. H. **Born,** Directeur de l'Union d'Entreprises Suisses de Transport.

** O. **Zuber,** Président de l'Union d'Entreprises Suisses de Transport.

** Dr. P. **Buchli,** Directeur des Chemins de fer Rhétiques, Membre du Conseil de l'Union d'Entreprises Suisses de Transport.

* A. **Brouckaert,** Directeur du Service du Matériel et des Achats de la Société Nationale des Chemins de fer Belges.

** P. **Buretier,** Ingénieur en Chef, Adjoint
Directeur du Matériel et des Achats
la Société Nationale des Chemins de f
Belges.

** F. **Van Rompaey,** Ingénieur Principal
la Société Nationale des Chemins de f
Belges.

** P. **Weytens,** Ingénieur à la Société Nati
nale des Chemins de fer Belges.

* E. **Clarembaux,** Directeur du Service de la Vo
de la Société Nationale des Chemins de f
Belges.

* M. **Crem,** Directeur du Service de l'Exploitatio
de la Société Nationale des Chemins de f
Belges.

** P. **Loumaye,** Ingénieur en Chef à la Dire
tion de l'Exploitation de la Socié
Nationale des Chemins de fer Belge

** L. **Discry,** Ingénieur en Chef à la Dire
tion de l'Exploitation de la Socié
Nationale des Chemins de fer Belge

** M. **Scoumanne,** Inspecteur Technique Pri
cipal à la Société Nationale des Ch
mins de fer Belges.

* Dr. Ing. A. **Cuttica,** Directeur Général Adjoint
Conseiller d'Administration des Chemins de f
italiens de l'Etat *(retired).*

* Ph. **Dargeou,** Directeur Général de la Socié
Nationale des Chemins de fer Français.

** L. **Queron,** Directeur du Personnel de
Société Nationale des Chemins de f
Français.

** A. **Beynet,** Ingénieur en Chef à la Dire
tion du Personnel de la Société Nati
nale des Chemins de fer Français.

* F. H. **Delory,** Directeur Général Honoraire de la Société Nationale des Chemins de fer Belges, Honorary President of the International Railway Congress Association.

* E. **Derijckere,** Directeur du Service de l'Electricité et de la Signalisation de la Société Nationale des Chemins de fer Belges.

** L. **Devillers,** Ingénieur en Chef, Adjoint au Directeur de l'Electricité et de la Signalisation à la Société Nationale des Chemins de fer Belges.

* M. **De Vos,** Directeur Général de la Société Nationale des Chemins de fer Belges, President of the International Railway Congress Association.

* M. **Dias Trigo,** Directeur des Services d'Exploitation et du Matériel de la Direction des Transports terrestres au Ministère des Communications du Portugal.

* E. **Dorges,** Secrétaire Général Honoraire aux Travaux Publics et aux Transports, Délégué Général aux Affaires Internationales du Ministère des Travaux Publics et des Transports (France).

** A. **Doumenc,** Directeur Général des Chemins de fer et des Transports au Ministère des Travaux Publics et des Transports (France).

* A. R. **Dunbar,** Manpower Adviser, British Transport Commission.

** S. C. **Harvey,** Assistant to Commercial Officer, Western Region, British Railways.

* H. **Geitmann,** Präsident der Deutschen Bundesbahn.

** Dr. H. J. **Finger,** Ministerialdirigent. Deutsche Bundesbahn.

** W. **Hennig,** Ministerialrat bei der Hauptverwaltung der Deutschen Bundesbahn.

* P. **Ghilain,** Directeur Honoraire du Service du Matériel et des Achats de la Société Nationale des Chemins de fer Belges, General Secretary of the International Railway Congress Association and Member of Honour of the Permanent Commission.

* Dr. Ing. P. **Giobbe,** Directeur du Service du Personnel et des Affaires Générales des Chemins de fer de l'Etat Italien *(retired).*

* K. W. C. **Grand,** Member, British Transport Commission.

** S. E. **Raymond,** Assistant General Manager (Traffic), Scottish Region, British Railways.

* Dr. H. **Gschwind,** Président de la Direction Générale des Chemins de fer Fédéraux Suisses.

** E. **Moor,** Chef de la Division du Personnel des Chemins de fer Fédéraux Suisses.

** A. **Borer,** Adjoint au Chef Principal de l'Exploitation des Chemins de fer Fédéraux Suisses.

* R. **Guibert,** Directeur Général Adjoint de la Société Nationale des Chemins de fer Français.

** J. **Maincent,** Ingénieur en Chef, Chef de la Division du Service Général-M.T. à la Société Nationale des Chemins de fer Français.

** L. **Mistral,** Ingénieur Principal à la Division Coordination de la Direction Commerciale de la Société Nationale des Chemins de fer Français.

* Ranald J. **Harvey,** Consulting Engineer, Member of Honour of the Permanent Commission.

* R. **Hoens,** Directeur Général de la Société Nationale Belge des Chemins de fer Vicinaux.

** A. **André,** Président de la Société Nationale Belge des Chemins de fer Vicinaux.

** R. **De Clercq,** Inspecteur Général à la Société Nationale Belge des Chemins de fer Vicinaux.

* Ivan **Ivanov,** Director of Scientific Research, Railway Transport Institute, U.S.S.R. Railways.

** A. **Deribas,** Engineer, Railway Transport Ministry (U.S.S.R.).

** M. **Pokrovsky,** Engineer, Railway Transport Ministry (U.S.S.R.).

** V. **Ptentsov,** Engineer, Railway Transport Ministry (U.S.S.R.).

* Dipl.-Ing. M. **Jacobshagen,** Direktor bei der Hauptverwaltung der Deutschen Bundesbahn.

** E. **Kessler,** Direktor bei der Hauptverwaltung der Deutschen Bundesbahn, Leiter der Bauabteilung.

** Dr. H. **Krüger,** Direktor bei der Hauptverwaltung der Deutschen Bundesbahn.

* U. **Lamalle,** Directeur Général Honoraire de la Société Nationale des Chemins de fer Belges, Member of Honour of the Permanent Commission of the Association.

* Brig. Ch. A. **Langley,** Chief Inspecting Officer of Railways, Ministry of Transport (Great Britain).

** Colonel D. **McMullen,** Inspecting Officer of Railways, Ministry of Transport (Great Britain).

* J. **Lohmann,** Président des Chemins de fer Néerlandais, S.A. *(Excused.)*

** J. P. **Koster,** Directeur Général des Chemins de fer Néerlandais.

** D. J. **Wansink,** Directeur Général des Chemins de fer Néerlandais.

* P. **Lorenzo Ochando,** Director General de Ferrocarriles, Tranvias y Transportes por Carretera, Ministerio de Obras Publicas (Spain).

** J. **Perez Pozuelo,** Ingénieur en Chef, Dirección General de Ferrocarriles, Tranvias y Transportes por Carretera, Ministerio de Obras Publicas (Spain).

* W. H. **Maass,** Advisory Engineer to the High Commissioner for the Union of South Africa in Great Britain.

* L. T. **Madnani,** Railway Adviser to the High Commissioner for India in London.

* M. **Malderez,** Secrétaire Général du Ministère des Communications de Belgique.

** J. **Vrebos,** Directeur Général de l'Administration des Transports au Ministère des Communications (Belgium).

** P. **Nicolas,** Ingénieur en Chef à l'Adn nistration des Transports au Ministè des Communications (Belgium).

* R. F. **Marriott,** Advisory Engineer, Representati of the New Zealand Government Railways London.

* Ing. Z. **Modlinski,** Sous-Secrétaire d'Etat au Min tère des Communications de Pologne.

** I. **Gryzel,** Directeur Adjoint au Ministè des Communications de Pologne.

* J. P. **Musquar,** Directeur Général de la Soci Nationale des Chemins de fer Luxembourgec

* P. **Nolet de Brauwere,** Secrétaire Général Ho raire de la Société Nationale des Chemins fer Belges.

* Prof. Dr.-jur. H.-M. **Oeftering,** Erster Präsid und Vorsitzer des Vorstands der Deutsch Bundesbahn. *(Excused.)*

** Prof. Dr.-Ing. habil W. **Schmitz,** Minis rialrat bei der Hauptverwaltung Deutschen Bundesbahn.

** Dr. G. **Schrader,** Bundesbahnoberrat der Hauptverwaltung der Deutsch Bundesbahn.

* J. **Ratter,** Member of the British Transport Co mission.

** J. W. **Grieve,** Electrical Engineer (N Works), Eastern Region, British R ways.

* Dr. Ing. S. **Rissone,** Directeur Général des C mins de fer de l'Etat Italien.

** Prof. F. **Santoro,** Directeur Central Service Commercial des Chemins de de l'Etat Italien.

** Ing. M. **Valdivieso,** Directeur du Serv du Personnel des Chemins de fer l'Etat Italien.

* General Sir Brian **Robertson,** Bart., G.C. G. B. E., K. C. M. G., K. C. V. O., D. S. M. C., Chairman, British Transport C mission.

* Dr.-Ing. E. **Roscioni,** Inspecteur Général Supérieur de la Motorisation Civile et des Transports concédés au Ministère des Transports (Italy) *(retired).*

** L. **Pratesi,** Inspecteur Supérieur au Ministère des Transports (Italy).

* Dj. **Savičević,** Directeur Général Adjoint des Chemins de fer Yougoslaves. *(Excused.)*

** Dr. V. **Kolarić,** Conseiller Supérieur à la Direction Générale des Chemins de fer Yougoslaves.

** C. **Lešjanin,** Conseiller des Chemins de fer Yougoslaves.

* Dr. M. **Schantl,** Directeur Général des Chemins de fer Fédéraux Autrichiens.

* Dr. F. **Schelp,** Mitglied des Vorstandes und Präsident der Deutschen Bundesbahn.

** Dr. Ing. G. A. **Gaebler,** Ministerialrat bei der Hauptverwaltung der Deutschen Bundesbahn.

** K. **Nies,** Amtsrat, Deutsche Bundesbahn.

* Karnail **Singh,** Chairman of the Railway Board, Ministry of Railways, Government of India.

** H. D. **Awasty,** General Manager and Chief Engineer, Railway Electrification, Indian Railways.

** K. C. **Bansal,** Deputy Railway Adviser, Embassy of India in Bonn.

** I. B. **Bose,** Chief Signal and Telecommunication Engineer, Indian Railways.

** M. **Khullar,** Deputy Railway Adviser, Indian Railways.

** N. **Padmanabhan,** Deputy Chief Electrical Engineer, Indian Railways.

* P. E. N. **Skov,** Directeur Général des Chemins de fer de l'Etat Danois.

** S. **Haldbo,** Directeur Régional des Chemins de fer de l'Etat Danois.

* R. **Soulard,** Directeur du Mouvement de la Société Nationale des Chemins de fer Français.

** J. H. **Daudemard-Grégnac,** Ingénieur en Chef à la Société Nationale des Chemins de fer Français, Chef de la Division Commerciale de la Région Ouest.

** R. **Pares,** Ingénieur en Chef à la Société Nationale des Chemins de fer Français, Service Matériel et Traction, Région Est.

* H. E. **Stokke,** Directeur Général des Chemins de fer de l'Etat Norvégien. *(Excused.)*

Replaced by : L. **Tveten,** Directeur Général Adjoint des Chemins de fer de l'Etat Norvégien.

** A. **Aamodt,** Directeur de la Région de Drammen, Chemins de fer de l'Etat Norvégien.

** T. **Carlsen,** Directeur des Installations Fixes aux Chemins de fer de l'Etat Norvégien.

* J. **Tuja,** Secrétaire Général de l'Union Internationale des Chemins de fer.

** G. **Fenwarth,** Chef des Etudes Commerciales Marchandises, Conseiller Technique Supérieur à l'Union Internationale des Chemins de fer.

** P.-A. **Rousseau,** Chef des Services Exécutifs de l'Union Internationale des Chemins de fer.

* E. G. J. **Upmark,** Directeur Général des Chemins de fer de l'Etat Suédois. *(Excused.)*

Replaced by : R. **Thorhag,** Directeur Adjoint des Chemins de fer de l'Etat Suédois.

** A. L. **Karsberg,** Directeur des Services Electriques des Chemins de fer de l'Etat Suédois.

** A. **Sjöberg,** Directeur des Services Financiers et Recherches Economiques des Chemins de fer de l'Etat Suédois.

* R. **Vaubourdolle,** Directeur des Installations Fixes de la Société Nationale des Chemins de fer Français.

** J. G. **Walter,** Ingénieur en Chef, Chef de la Division des Installations de Sécurité, de Télécommunications et de Caténaires de la Direction des Installations Fixes à la Société Nationale des Chemins de fer Français.

** E. **Leroy,** Ingénieur à la Subdivision du Matériel Electrique de la Voie à la Société Nationale des Chemins de fer Français.

* Dr. Ing. W. **Wyrzykowski,** Vice-Directeur de l'Institut Scientifique des Essais et des Recherches Ferroviaires des Chemins de fer de l'Etat Polonais.

** Ing. A. **Makala,** Chef de la Division Télécommunications aux Chemins de fer de l'Etat Polonais.

BELGIAN PERSONALITIES WHO PARTICIPATED TO THE MEETING.

P.-W. **Segers,** Ministre des Communications de Belgique.

J. **Gordts,** Chef de Cabinet au Ministère des Communications (Belgium).

J. J. R. **Legardien,** Conseiller au Ministère des Communications (Belgium).

P. **Lalou,** Président de la Société des Transports Intercommunaux de Bruxelles.

P. **Reynaert,** Directeur Général de la Société des Transports Intercommunaux de Bruxelles.

C. **Harmel,** Président de l'Union Internationale des Transports Publics.

A. **Jacobs,** Secrétaire Général de l'Union Internationale des Transports Publics.

A. **Adam,** Directeur à la Direction Générale de la Société Nationale des Chemins de fer Belges.

L. **Lataire,** Directeur du Service des Finances de la Société Nationale des Chemins de fer Belges.

G. **Van Cauwenberge,** Directeur du Service Commercial de la Société Nationale des Chemins de fer Belges.

F. C. **Baeyens,** Directeur de l'Office de Recherches et d'Essais (O.R.E.).

REPORTERS.

E. M. **Arys,** Inspecteur Principal à la Direction d Personnel et des Services Sociaux de la Sociét Nationale des Chemins de fer Belges.

J. A. **Broughall,** Electrical Engineer (Development British Transport Commission, British Railway Division.

Edgar J. **Larkin,** Director of Work Study, Britis Transport Commission.

L. **Lohier,** Ingénieur en Chef, Chef Adjoint de l Direction Commerciale de la Société National des Chemins de fer Français.

Prof. Dr.-Ing. R. **Righi,** Directeur de l'Institut Expe rimental des Chemins de fer de l'Etat Italier

Dr. G. **Schrader,** Bundesbahnoberrat in der Haup verwaltung der Deutschen Bundesbahn.

Sven **Svensson,** Electrical Engineer, Telecommunica tions, Swedish State Railways.

BUREAUS OF THE SECTIONS.

SECTION I. — Way and works.

President :

A. **d'Arbela,** Directeur Adjoint du Service du Maté riel et de la Traction des Chemins de fer d l'Etat Italien.

Vice-President :

E. **Derijckere,** Directeur du Service de l'Electricit et de la Signalisation de la Société National des Chemins de fer Belges (Member of th Permanent Commission).

Principal Secretary :

P. **Schoonjans,** Ingénieur Principal à la Sociét Nationale des Chemins de fer Belges, Technica Secretary of the Association.

English Secretary :

A. E. **Beresford,** Engineer, Eastern Region, Britis Railways.

SECTION II. — Working.

President :

Dr. F. **Schelp,** Mitglied des Vorstandes und Präsident der Deutschen Bundesbahn (Member of the Permanent Commission).

Vice-President :

Dr. M. **Schantl,** Directeur Général des Chemins de fer Fédéraux Autrichiens (Member of the Permanent Commission).

Principal Secretary :

. **Marchal,** Ingénieur Principal à la Société Nationale des Chemins de fer Belges.

English Secretary :

. **Pickering,** British Railways, Office of the General Agent for Belgium and Luxemburg.

SECTION IV. — General.

President :

ir John **Benstead,** Deputy Chairman of the British Transport Commission (Member of the Permanent Commission).

Vice-President :

. **Guibert,** Directeur Général Adjoint de la Société Nationale des Chemins de fer Français (Member of the Permanent Commission).

Principal Secretary :

W. **van Rijn,** Ingénieur Principal à la Société Nationale des Chemins de fer Belges, Technical Secretary of the Association.

English Secretary :

S. **Cahill,** Coras Iompair Eireann.

GENERAL SECRETARIES.

P. **Ghilain,** Directeur Honoraire du Service du Matériel et des Achats de la Société Nationale des Chemins de fer Belges, *General Secretary of the Association.*

R. **Squilbin,** Ingénieur Principal à la Société Nationale des Chemins de fer Belges, *Assistant to the General Secretary of the Association.*

J. L. **Harrington,** Chief Shipping and International Services Officer, British Transport Commission.

TECHNICAL SECRETARIES.

A. **Jacops,** Ingénieur en Chef à la Société Nationale des Chemins de fer Belges.

H. A. **Verbeeck,** Ingénieur Principal à la Société Nationale des Chemins de fer Belges.

List of questions on the agenda of the 18th Session (Munich, 1962).

SECTION I :

WAY AND WORKS.

1. Adaptation of the methods of laying, aligning and maintaining the permanent way to carry traffic at very high speeds (75 m.p.h. and more) :

a) on the straight;

b) on curves;

so far as they affect safety and taking into account the type of rolling stock used.

2. Means of reducing the final cost of signalling installations by standardization or other methods, including the use of electronics and other modern techniques.

SECTION II :

LOCOMOTIVES AND ROLLING STOCK.

3. Latest developments in the braking of railway rolling stock (systems, control, types of equipment, materials used...).

4. Safety and automation on electric and Diesel motor power units.

Application of automation techniques in the driving of power units (locomotives and motorcoaches), automatic starting, control of the spinning and skidding of the wheels, automatic transmission of the signal indications and automatic stopping : vigilance and dead-man's devices; application of electronics.

SECTION III :

WORKING.

5. The economics of railway operation using modern techniques of telecommunications and signalling, taking into account the possibilities offered by electronics to promote automation in :

a) the control of train movements;

b) wagon-control;

c) centralizing signalling operations (C.T.C.);

d) marshalling yards.

6. Co-ordination between main line railways and metropolitan or suburban railways (including elevated, underground and other specialized railways). Transfer points (distances, positions, arrangements); lay-out of the lines; town-planning and economic considerations.

SECTION IV :

GENERAL.

7. Application of operational research on the railways with particular reference to the purchase of material and stores, stores management and control of the quality of the purchases; traffic market research, etc.

8. Policy and problems relating to the education and training of the staff. Training in safety measures.

SECTION V :

COMPLEMENTARY AND SUBSTITUTE SERVICES.

9. Co-ordination of rail and road transport-passenger and freight on secondary lines. The elements of the problem. — Balance between road and rail. — Various methods of organisation.

10. Modern methods for the economical working of secondary lines.

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

Enlarged Meeting of the Permanent Commission in Brussels

(27th to 29th June, 1960).

Summary of sectional proceedings.

SECTION I. — Way and Works.

[**656** .25]

QUESTION 1.

The effect of electric traction on signalling and communication circuits, in particular reference to the means of overcoming interference, to provide safety and good communications.

Preliminary documents.

Report : *(America (North and South), Australia, Burma, Ceylon, Egypt, Ghana, India, Irak, Iran, Republic of Ireland, Japan, Malaysia, Netherlands, New Zealand, Norway, Pakistan, Phillipines, South Africa, Sudan, Sweden, Union of Socialist Soviet Republics, United Kingdom of Great Britain and Northern Ireland and dependent overseas territories)*, by Sven SVENSSON and J.A. BROUGHALL. (See *Bulletin* for April 1960, p. 337.)

Report : *(Austria, Belgium and Belgian Congo, Bulgaria, Cambodia, Czechoslovakia, Denmark, Ethiopia, Finland, France and French Union, West Germany, Greece, Hungary, Indonesia, Italy, Lebanon, Luxemburg, Poland, Portugal and overseas territories, Rumania, Siam, Spain, Switzerland, Syria, Turkey, Viet-Nam and Yugoslavia)*, by R. RIGHI. (See *Bulletin* for May 1960, p. 419.)

Addendum to Report, by R. RIGHI. (See *Bulletin* for June 1960, p. 540.)

Special Report by R. RIGHI. (See *Bulletin* for June 1960, p. 505.)

SECTIONAL DISCUSSION.

Meeting on 27th June, 1960 (afternoon).

Chairman : Mr. A. d'Arbela, *Directeur Adjoint du Service du Matériel et de la Traction, Italian State Railways.*

— The meeting is opened at 2.15 p.m.

The Chairman welcomes the Delegates and submits, on behalf of the Permanent Commission, the following nominations for the Section Bureau :

as *Vice-Chairman :*

Mr. E. Derijckere, Directeur de l'Electricité et de la Signalisation, Belgian National Railways;

as *Principal Secretary :*

Mr. P. Schoonjans, Ingénieur Principal, Belgian National Railways;

as *English-language Secretary :*

Mr. A.E. Beresford, British Railways, Eastern Region.

— *These proposals are approved.*

The Chairman thanks the Reporters and the Special Reporter, emphasizing the importance of the task which they have been ready to undertake in working out their reports, prepared with extremely great care and competence.

He calls upon Mr. Righi, *Special Reporter*, to give a brief summary of the question studied.

The Chairman then declares the meeting open for *General Discussion.*

Mr. Vaubourdolle *(French National Railways)*, points out that, in this question, two problems should be considered : viz. the one concerning the telecommunications and signalling circuits belonging to the railways, the other concerning the telecommunications circuits of the postal authorities. In solving the first problem, the railway administrations are free to adopt their own techniques and installations. In studying the second problem, they are often forced to accept solutions, onerous at times, which are governed by the present position of the postal installations and which may one day be found useless as a result of technical developments. He recalls the use of booster transformers as a result of the out-of-balance of the postal circuits. Owing to this dualism, it is difficult to formulate summarizing conclusions. These should express the desirability of a close understanding between the administrations concerned — an understanding which has been achieved in France, and of which the S.N.C.F. are the first to benefit.

Mr. Brentnall *(British Railways)* emphasizes a point made by Mr. Righi in his summary, who had talked of installing isolating transformers in the telecommunication circuits at intervals of 20 km with a view to reducing interference. This is no doubt physically simple; but it entails the loss of the D.C. loop. Signalling currents can only be transmitted by using audio-frequencies, but this entails additional costs of installation and maintenance, and British Railways have preferred the installation of supplementary screening cables to that of isolating transformers, except over great distances.

Mr. WALTER *(French National Railways)*, agreeing with the previous speaker, wishes to emphasize the complexity of the problem : with the increase in importance and improvement in quality of screening it has become possible to space the transformers at greater intervals, up to 30 or 40 km, so that their inherent disadvantage is greatly reduced, if not eliminated. Moreover, by means of transistors, it is in many cases possible for the telecommunications and signalling circuits to work with A.C., which has a great number of advantages, especially as regards selection.

Passing on to the *detailed discussion* of the draft summaries, the CHAIRMAN reads out

Summary No. 1 :

1. It is the general opinion of the Administrations that interference between the substation power feeder lines and the telecommunications and signalling circuits does not present a special problem.

This summary is adopted without discussion.

Summary No. 2 :

2. At D.C. substations, transformer-rectifier sets of the mercury vapour type are now in virtually general use. Most of the administrations use six-phase or twelve-phase rectifiers.

Filters designed to reduce the harmonics are not often used with undulating currents.

The equipment of A.C. substations depends on the frequency. The solutions adopted may comprise either transformers only, or rotary sets. In both cases, the feeders are protected by ultra-high-speed circuit breakers. Automatic reclosure is often used, with or without automatic earth tests.

Mr. VAUBOURDOLLE suggests to the Special Reporter that the wording might be slightly amended since, in regard to the use of filters, no distinction is made between overhead lines and cables.

The CHAIRMAN and Messrs. RIGHI and SCHOONJANS undertake to prepare a wording in which this suggestion is taken into account.

Mr. KARSBERG *(Swedish State Railways)* draws attention to the desirability of reducing the current harmonics at their source.

Mr. BAEYENS *(Office of Researches and Experiments)* asks that emphasis should be laid on the fact that the protection of the feeders by ultra-high-speed circuit breakers is necessary for D.C. as well as A.C.

Mr. KOSTER *(Netherlands Railways)* thinks that, in the last sentence, the words « automatic *earth* tests » are not sufficiently precise.

After contributions by the CHAIRMAN, Mr. RIGHI and Mr. VAUBOURDOLLE, the meeting agrees to substitute the words « automatic testing of the insulation of the catenary ».

— *The Assembly finally adopts the following text :*

« 2. At D.C. substations, transformer-rectifier sets of the mercury vapour type are now in virtually general use. Most of the Administrations use six-phase or twelve-phase rectifiers. Filters designed to reduce harmonics with rectified current are not often used when the circuits which might be affected are cabled.

« The equipment of A.C. substations depends on the frequency. The solutions adopted may comprise transformers only, or rotary sets.

« In both A.C. and D.C. cases the feeders are protected by ultra-high speed circuit breakers. Automatic reclosure is often used, with or without automatic testing of the insulation of the catenary. »

Summary No. 3 :

3. The problem of interference phenomena between the traction contact lines and the telecommunication and signalling circuits (which are normally produced by magnetic induction, and measured by the voltage induced) has been the subject of calculation by several Administrations. As far as possible, the factors having a bearing on the subject and the effective current values for normal loads in case of short-circuits are being taken into account. With direct currents, in particular, the calculated or measured current gradients must be taken into consideration. The calculations are based on the formulas recommended by C.C.I.T.T. and, as regards the case of D.C. at the moment of a short-circuit, on the method of a short-circuit, on the method of equivalent frequencies.

The values of normal load and short-circuit currents which should be taken into account in this connection are still a matter for discussion. There is, however, a tendency to use, as a basis, the actual load encountered in practice.

The soil resistivity factor which plays an important part in the sphere of telecommunications, is still illdefined and little known, and continues to be the subject of numerous studies. Several parameters have the effect of modifying the depth of current penetration, which may falsify the results obtained from the various measuring methods in use.

So far, only few administrations have carried out systematic measurements in this sphere, though it would be highly desirable to proceed with such measurements. It would, moreover, be very fortunate if the measurements could be carried out in accordance with standardized methods, and with the collaboration of the organisations or Administrations interested in the question.

Mr. WALTER calls attention to the text concerning soil resistivity, a sphere where it is still necessary to obtain a good deal more knowledge both in regard to principles and in regard to measuring methods. Before proceeding with the electrification of a railway line, a certain number of soil resistivity measurements are often made. The same applies to H.T. power transmission lines which may have a detrimental influence on our signalling and telecommunications circuits. It would be desirable to generalize and standardize the methods, to take part in the studies made by other administrations interested in the problem, and possibly to prepare an atlas of soil resistivity. He proposes to set out this idea more explicitly.

Mr. BRENTNALL offers to make available, to other administrations, the results of the soil resistivity tests which have been undertaken in Great Britain.

Mr. LESJANIN *(Jugoslav Railways)* is of the opinion that, for the calculation of interference phenomena, the application of the formulas established by C.C.I.T.T. and C.M.I. should be recommended.

Mr. RIGHI observes that, especially in connection with the elaboration of the formulas, the U.I.C. is represented at the C.C.I.T.T. by Mr. WALTER himself.

— *The Delegates adopt unanimously the following text, amended in the sense requested by* Mr. WALTER :

« 3. The problem of interference phenomena between the traction contact lines and the telecommunications and signalling circuits (which are normally produced by magnetic induction, and measured by the voltage induced) has been the subject of calculation by several Administrations. As far as possible, the factors having a bearing on the subject and the effective current values both for normal loads and for short-circuits are being taken into account.

« With direct current systems in particular, the calculated or measured current gradients must be taken into consideration. The calculations are based on the formula recommended by the C.C.I.T.T., and in the case of D.C., at the moment of a short-circuit, on the method of equivalent frequencies.

« The values of normal load and short-circuit currents which would be taken into account in this connection are still a matter for discussion. There is, however, a tendency to use, as a basis, the actual load encountered in practice.

« The soil resistivity factor which plays an important part, is still illdefined and little known, and continues to be the subject of numerous studies. Several parameters have the effect of modifying the depth of current penetration, which may falsify the results obtained from the various measuring methods in use.

« So far only few Administrations have carried out systematic measurements in this sphere, though it would be highly desirable to proceed with such measurements. Along high tension lines which could give rise to inductive effects as well as along railway lines scheduled for electrification, it is desirable that measurements should be carried out in accordance with standardised methods, and with the collaboration of the organisations or Administations interested in the question. »

Summary No. 4 :

4. The compensating factors able to influence the coupling effects are apt to vary greatly.

In several instances of A.C. electrification, with or without return conductors, the use of booster transformers represents an additional compensating factor as it reduces the flow of current in the soil.

With D.C. electrifications, certain Administrations limit the number of connections between the supporting structures of the catenary and the rail in order to reduce the leakage of traction current to the soil. Discharge gaps, which would represent an effective means of reducing the leakage currents, are not often used as they are rather expensive.

Mr. WALTER suggests that Summary No. 4 should rather be taken after the one numbered 7 in the Special Report.

The CHAIRMAN agrees and postpones the discussion of Summary No. 4 to the next day's meeting.

(At that discussion, however, it was decided to leave the original sequence unchanged. Though not in keeping with the chronological order of the transaction, that discussion is reported here.)

Mr. WALTER suggests that the following text should be inserted after the second paragraph.

« However, as the use of booster transformers is a considerable cost on the railway administration both in capital and annual charges, they should only be considered after studying the modifications of the telecommunication circuits which might obviate the need for using that method. This investigation which should take into account the development of telecommunications equipment, can only be carried out in full agreement with the administration owning the circuits. Moreover, to obtain the most economic solution, collaboration between the two administrations is highly desirable. »

Mr. Karsberg points out that his administration has not experienced any difficulties with the use of booster transformers. On the contrary, this has been found to be the only economic solution where soil of high resistivity is encountered.

Mr. Broughall *(British Railways and Reporter)* stresses the fact that the solution to be aimed at should not only be the most economic solution but also the most practical one.

Mr. Lesjanin points out that the use of booster transformers results in a marked reduction in economic efficiency. In his opinion, overhead telecommunication lines tend to disappear anyway as a result of modern technical developments so that the presence of such transformers must now be regarded as an exceptional case. He suggests that the following words should be added at the end of the second paragraph : « but at the cost of a decrease in the efficiency of the traction circuit ».

Mr. Karsberg criticizes the term « considerable cost » in the English translation of the French version « assez onéreux ». In his opinion, this term is too strong and should be replaced by « additional cost » (corresponding to the French « dépense supplémentaire »).

Following a discussion on the possible importance of this additional cost, which is assessed by some at 30% and by others at 5%, the Chairman accepts the term « additional cost » in the English text, and « assez onéreux » in the French text.

Mr. Makala *(Polish State Railways)* suggests to add, at the end of this Summary, that it is desirable for the different administrations to exchange information about the values of the compensating factors measured over different distances.

The Chairman replies that the exchange of information is one of the principal aims of the I.R.C.A. so that there would seem to be no point in repeating it.

This opinion is shared by the majority of those present.

Mr. Pokrovsky *(U.S.S.R. Railways)* reverts to the last paragraph of this draft Summary. The Reports indicate that spark gaps as well as earth wires are used, he says, to reduce the effects of the traction current on two-rail track circuits, to ensure automatic protection in the event of a broken rail, and to reduce the difficulties due to cable corrosion in the case of D.C. electrification.

In his opinion, Summary No. 4 merely brings out the last-named aspect of the question. But the first two aspects — spark gaps, and protection in the event of a broken rail — are also very important. He therefore suggests the following text :

« Certain administrations limit the number of connections between the supporting structures of the catenary and the rail in order to reduce the effects of traction current on two-rail track circuits, and to ensure an automatic protection against rail breakage and corrosion of cable sheathing with D.C. electrification. For this purpose, use is made of spark gaps as well as earth wires ».

Mr. RIGHI accepts the suggestion but thinks that in the wording, the cable sheathing should not appear to be the only part exposed to corrosion. It is necessary to keep in mind everything which may be encountered in the vicinity of the tracks, such as, for instance, pipelines.

Mr. DEVILLERS *(Belgian National Railways)* suggests that the following should be added at the end of the last paragraph : « It is even possible completely to eliminate connections to the rail by connecting all the catenary supports with each other by means of an overhead cable ». Apart from spark gaps, this is another method frequently used, especially with automatic block working.

Mr. POKROVSKY points out that the present Summary (No. 4) deals with compensating factors whilst Summary No. 7 deals with screening factors. These are different questions, and the Reporters must have had good reasons for dealing with them in different Summaries and in the proposed order. There would thus seem to be no point in reversing that order. He therefore suggests that Summary No. 4 should be left in its original place (*).

A discussion between the CHAIRMAN and Messrs. BROUGHALL, LESJANIN, VAUBOURDOLLE and WALTER deals with the subject of the relative importance of compensating and screening effect. The Section eventually approves the proposal to leave the original sequence of the Summaries unchanged.

— *The following is the text finally adopted for Summary No. 4 :*

« 4. The compensating factors which influence the coupling effects vary greatly.

« In some cases of A.C. electrification the use of booster transformers, with or without return conductors, represents an additional compensating factor — it may be necessary in the case of high resistivity in the soil for instance — as it reduces the flow of current in the soil, at the cost of some loss of energy in the traction circuit.

« The use of booster transformers is, however, an additional cost on the railway administration both in capital and annual charges, and they should be considered only after investigating the possibility of modifying the telecommunication circuits to avoid recourse to this method. This investigation, which should take into account the probable development of the telecommunications equipment, can be made only in full agreement with the Administration owning the circuits, moreover, to obtain the most economical and practical solution, collaboration between the two Administrations is essential.

(*) As already mentioned at the beginning of the discussion of Summary No. 4, it had been suggested to take this summary after Summary No. 7. As that suggestion was accepted at the time, the discussion reported here actually took place after the discussion of Summary No. 7.

« With D.C. electrification, certain Administrations limit the number of connections between the supporting structures of the catenary and the rail in order to reduce as much as possible the effects of traction current on two-rail track circuits, to give a warning of rail breakage and to reduce corrosion of buried cables and metallic conduits. For this purpose use is made of spark gaps and also earth wires. It is even possible completely to eliminate connections to the rail by continuous connection of the catenary supports. »

Summary No. 5 :

5. The question of screening effects is extremely complex. These effects are difficult to measure and, because of the diversity of the relevant factors as between one network and another, it is difficult to interpret the results of the practical tests which can be carried out in this respect. On A.C. electrified lines, however, the question of determining the currents in the conductors (modulus and phase angle) must be faced.

Some Administrations have carried out, or are now carrying out, measurements in this sphere. So far, however, the results obtained are few in number, and hardly conclusive.

Mr. KARSBERG suggests that in the first paragraph the reference to A.C. electrified lines should be omitted. The Summary would thus assume a more general importance since, even with D.C. electrification, there are undulatory current in the catenary. *(Assent.)*

Mr. VAUBOURDOLLE, whilst expressing agreement as regards the complexity of the question of screening effects, suggests that the Summary should be prefaced by a sentence referring to the undeniable effectiveness of the latter.

Mr. WALTER suggests that a new paragraph should be placed at the beginning of Summary No. 5; following some discussion, the text of this paragraph is adopted.

— *The Summary thus takes the following form :*

« 5. It is important that account should be taken of the screening effects which arise from the metalwork in the vicinity of the signalling and telecommunication lines (metallic conduits, long structures and, of course, nearby sheaths and rails). The question of screening effects is, however, extremely complex. These effects are difficult to measure and, because of the diversity of the relevant factors as between one network and another, it is difficult to interpret the results of the practical tests which can be carried out in this respect. The question of determining the currents in the conductors (modulus and phase angle) must be faced.

« Some Administrations have carried out, or are now carrying out measurements in this sphere. So far, however, the results obtained are few in number, and hardly conclusive.

« The volume of information supplied on the screening factor of metallic sheathing is small. The factor varies with the frequency and with the saturation condition of the metallic armouring. It is desirable that Administrations should carry out tests and exchange information on the results. »

Summary No. 6 :

6. Among the precautions taken with a view to limiting the interference phenomena in groups of overhead telecommunication lines running along electrified railway tracks,

the following measures can be named: elimination of earth returns; placing the overhead lines at the greatest practicable distance from the tracks (though this factor does not exert a preponderant influence), and mainly, the transposition of the conductors.

It is important to arrange the lines in accordance with a carefully studied transposition scheme, designed to reduce the transposition intervals. But even with perfectly regularly spaced transpositions, various factors which are unavoidable with the operation of overhead lines are liable to introduce unbalance conditions which are, moreover, apt to vary.

It would be desirable to carry out supplementary research and studies on the subject of the sensivity coefficients and their variations.

Mr. WALTER points out that the importance of eliminating earth returns is not confined to overhead lines; it also applies to cabled circuits and signalling circuits.

— *The Assembly agrees to introduce this point and finally adopts the following text :*

« 6. Among the precautions taken with a view to limiting the interference phenomena in groups of overhead telecommunication lines running along electrified railway tracks, the following measures can be named : elimination of earth returns (this measure is, moreover, recommended for all types of circuit); placing the overhead lines at the greatest practicable distance from the tracks (though this factor does not exert a preponderant influence); and mainly, the transposition of the conductors.

« It is important to arrange the lines in accordance with a carefully studied transposition scheme, designed to reduce the transposition intervals. But even with perfectly regularly spaced transpositions, various factors which are unavoidable with the operation of overhead lines are liable to introduce unbalance conditions which are, moreover, apt to vary.

« It would be desirable to carry out supplementary research and studies on the subject of the sensitivity coefficients and their variations. »

Summary No. 7 :

7. For the installation of telecommunication and signalling cables along electrified lines, buried cables are generally preferred. Some Administrations, however, prefer cable conduits which ensure a better mechanical protection of the cables and which, moreover, contribute to the corrosion protection of the cables in the case of D.C. traction.

The types of cables in use are generally provided with metallic armouring. They comprise a lead sheath and, fairly often in the case of A.C. electrifications, an armouring of steel tape or wire. Most of the Administrations do not attach particular importance to the use of high permeability armouring.

The insulation of the conductors is generally of the dry paper type for telephone circuits, and of the impregnated paper type for signalling circuits.

The use of aluminium sheathing is recommended by several Administrations. In many cases, too, external sheathing or coatings of insulating materials are provided as a precaution against corrosion.

Little use is made, so far, of cables without metal reinforcement where the conductors are insulated with plastics such as polythene or polyvinyl chloride, or with natural rubber, and where the sheath consists of polyvinyl chloride or synthetic rubber.

Except in the case of D.C. electrifications, the interruption of the continuity of the metallic armouring is not a widespread practice. In some cases where this is done, the joints are not bridged by capacitances.

With D.C. traction, the sheathings and armourings of the cables are not generally earthed except sometimes at one point. But this practice is more widespread in the case of A.C. traction.

The volume of information provided on the subject of the screening factor of metallic sheathing is rather small. The factor varies with the frequency and with the saturation condition of the metal armouring.

Mr. LESJANIN points out that the proposed text might appear to suggest that the use of cables with plastics insulated conductors is not favoured by the administrations; it would be more appropriate to state that such conductors are still relatively unknown.

It is found that the English text is already in line with the observation of the Jugoslav Delegate, and the French text is amended accordingly.

Mr. LESJANIN proceeds to explain that the earthing of cable sheath and armouring is not only frequent but is in fact indispensable in the case of A.C. in order to improve the compensating factor of the cables.

Mr. RIGHI replies that earthing is always advantageous but not always desirable with D.C. He does, however, accept a modification of the wording of the summary.

Mr. BRENTNALL expressess agreement although, in Great Britain, D.C. does not give rise to corrosion trouble.

He states, however, that in his opinion, wire armouring is not as effective as screens, and suggests that the following words should be added to the second paragraph : « ... tape or wire, although the latter type is not so effective. »

In the sixth paragraph, he would like to see the text amended : « ... the interruption of the continuity of the metallic *sheathing and* armouring... ».

Mr. RIGHI then proposes that the last paragraph should be omitted which, on reflection, does not constitute a summary and makes no contribution.

— *The Assembly, having approved all these suggestions, finally adopts the following text :*

« 7. For the installation of telecommunication and signalling cables along electrified lines, buried cables are generally preferred. Some Administrations, however, prefer cable conduits which ensure a better mechanical protection of the cables and which, moreover, contribute to the corrosion protection of the cables in the case of D.C. traction.

« The types of cables in use are still generally provided with metallic armouring. They comprise a lead sheath and, fairly often in the case of A.C. electrification, an armouring of steel tape or wire, although the latter type may be less efficient. Most of the Administrations do not attach particular importance to the use of high permeability armouring.

« The insulation of the conductors is generally of the dry paper type for telephone circuits, and of the impregnated paper type for signalling circuits.

« The use of aluminium sheathing is recommended by several Administrations. In many cases, too, external sheathing or coatings of insulating materials are provided as a precaution against corrosion.

« Little use is made, so far, of cables without metal reinforcement where the conductors are insulated with plastics such as polythene or polyvinyl chloride, or with natural rubber, and where the sheath consists of polyvinyl chloride or synthetic rubber.

« Except in the case of D.C. electrification, the interruption of the continuity of the metallic sheathing and armouring is not a widespread practice. In some cases where this is done, the joints are not bridged by capacitances.

« With D.C. current, earthing of sheathing and armouring is not applied except at one point, because of the risk of corrosion. On the other hand, with A.C. current there is nothing to prevent earthing, as it increases the screening effect of the sheaths and armouring. »

— The meeting is closed at 5.15 p.m.

Meeting on 28th June, 1960.

*Chairman : Mr. d'*ARBELA

The CHAIRMAN opens the meeting at 9 a.m.

It is at the beginning of this meeting that the discussion of Summary No. 4, reported earlier on, did in fact take place.

This is followed by the discussion of *Summary No. 8 :*

8. The precautions taken against longitudinal induced voltages consist in ascertaining that these voltages, even in the most unfavourable circumstances, remain far below the breakdown test voltage between conductors. The usual interruption of the circuits at the amplifiers may be sufficient to reduce these voltages. Intermediate sectionalisation by means of 1/1 isolating transformers may however, become necessary. This measure gives rise to the problem of verifying the insulation of the conductors which can be done by different methods.

The protection devices in use are of conventinal types : fuses, thermal coils, overvoltage protection devices, lightning arresters. The use of rectifiers as a precaution against acoustic shocks is also reported.

Mr. BRENTNALL is of the opinion that the proposed text is incomplete, and suggests that the end of the first paragraph should be amended to read as follows : « ... insulation between conductors *and sheath* ».

Mr. RIGHI points out that it is also necessary to take into account the dielectric strength between conductors, as it is possible to have an earth on one conductor at one point, and another earth on another conductor at a different point; in this case, there would be voltage differences between conductors.

Mr. BRENTNALL accepts this explanation but suggests that, in the first sentence of the first paragraph of the English text, the word « ascertaining » should be replaced by « ensuring »; this would also be more in keeping with the French text, and with the thoughts of the author.

Mr. KARSBERG, continuing the reading of the same paragraph, is of the opinion that it would be desirable to replace the words « Intermediate sectionalisation ... may however become necessary » by the words « ... may however represent a suitable solution ».

— *Subject to these modifications, the following text is approved :*

« 8. The precautions taken against longitudinal induced voltages consist in ensuring that these voltages, even in the most unfavourable circumstances, remain far below the breakdown test voltage between conductors, and between conductors and sheaths. The usual interruptions of the circuits at the repeaters may be sufficient to reduce these voltages. Intermediate sectionalisation by means of 1/1 isolating transformers may, however, represent a suitable solution. This measure gives rise to complications when verifying insulation of the conductors, which can nevertheless be done by different methods.

« The protection devices in use are of conventional types : fuses, thermal coils, overvoltage protection devices, lightning arresters. The use of rectifiers as a precaution against acoustic shocks is also reported. »

Summary No. 9 :

9. As a result of the precautions taken, the disturbances experienced are very small. In some cases, they are confined to occasional breakdowns or unbalance conditions.

Little information has been provided on the subject of the noise voltages observed, but these values always seem to be very small.

— The draft of this Summary is approved, subject to the addition of the word « only », as a translation of the word « seulement », which had been omitted in the English version.

Summary No. 10 :

10. The value of the potential against earth has not generally been reported, but it does not, in any case, exceed 120 V under normal working conditions.

For safety reasons, the staff are often required to adhere to certain rules when carrying out work on the circuits; these rules take into account the measures taken to reduce the voltages to which the staff are liable to be exposed. Special precautions may become necessary if the cables are placed close to a live catenary. Normally, no special precautions are taken in the case of signalling circuits, because of the short length of the latter.

— Approved without discussion.

Summary No. 11 :

11. The most effective way of guarding against the danger of electrolytic corrosion (which need only be taken into account in the case of D.C. electrifications) is to reduce the electric resistance of the track as much as possible, and to insulate the rails as effectively as possible from the soil. It is, however, necessary to ensure that the rail-earth potential does not become dangerous to staff.

Apart from resorting to cable conduits, special sheathing, special tape wrapping, or interruptions in the electric continuity of the armouring (passive protection), the cables are sometimes also protected by polarized drainage or tapping (active protection).

Mr. SVENSSON, *(Swedish State Railways and Reporter)* points out that, in the sixth paragraph of Summary No. 7, the continuity of the metallic sheaths *and armouring* had been taken into account. The same should be done here (second paragraph).

— Subject to this amendment, the text adopted becomes :

« 11. The most effective way of guarding against the danger of electrolytic corrosion (which need only be taken into account in the case of D.C. electrifications) is to reduce the electric resistance of the track as much as possible, and to insulate the rails as effectively as possible from the soil. It is, however, necessary to ensure that the rail-earth potential does not become dangerous to staff.

« Apart from resorting to cable conduits, special sheathing, special tape wrapping, or interruptions in the electric continuity of the sheaths and armouring (passive protection), the cables are sometimes also protected by polarized drainage or tapping (active protection). »

Summary No. 12 :

12. The problems associated with the working of track circuits differ for D.C. and A.C. electrifications, respectively.

The questions of unbalance phenomena in track circuits in two lines of insulated rails, and of the induction effects to be expected between a track circuit and the contact wires or rails of the adjacent track, would seem to merit closer studies than has been the case so far.

The connection schemes are so designed as to ensure safety even under abnormal conditions prevailing in the traction network.

The inductive connections used in the track circuits are so designed that an unbalance not exceeding a certain value (which, incidentally, varies as between one Administration and another) between the two windings does not disturb the working of these circuits. All the receiver apparatus used in the track circuits must be designed to work with particularly high selectivity.

It is considered that the systems in use do not call for special precautions as regards transient phenomena.

Overvoltage protection, where this is deemed necessary, is obtained either by means of spark gaps or discharge gaps or by means of a judicious adaptation of the equipment (transformers becoming saturated when the currents become too high).

— *Adopted without modification.*

Summary No. 13 :

13. *With D.C. electrification,* the following types of track circuits are used :

— A.C. feed at industrial frequency (42, 50, 60 and 83.3 c/s), using induction relays with two de-phased elements or, sometimes, rectifier relays;

— A.C. feed at frequencies of the order of 1 000 to 20 000 c/s or with high tension impulses, obtained by means of electronic apparatus, using appropriate D.C. relays;

— track circuits with coded currents, using coding and decoding relays;

— sometimes, for very short track circuits, D.C. feed.

Where single-rail track circuits are used, a length limitation must be accepted. Certain Administrations take further precautions in order to protect the equipment and to ensure the proper working of the installations. Other Administrations regard these precautions as unnecessary as they do not enhance safety.

With two-element induction relays, the effects of the harmonics of the rectified current need not be feared. With rectifier relays, the length of the track circuits must be limited.

The use of protective devices (fuses or discharge gaps) varies greatly as between one Administration and another.

Mr. WALTER questions the appositeness of mentioning the frequency of 83.3 c/s among the industrial frequencies.

Mr. POKROVSKY is of the opinion that there appears to be no point in mentioning the use of D.C. feeds for very short track circuits; it seemed to him that the cases referred to in the Report by Messrs. BROUGHALL and SVENSSON were very exceptional. Also, A.C. of 83.3 c/s was exclusively used by the Japanese Railways in special circumstances where two types of electrification are involved; again, this was an exceptional case. In his opinion, this frequency should therefore not be mentioned. On the other hand, the frequency of 25 c/s used by the Victoria Railways should be included in the list as it is of real importance.

Finally, he also suggests a modification of the paragraph relating to the effects of the harmonics where two-element relays are used. The question is difficult, and experience shows that one has to be very careful. He therefore suggests the following text :

« With two-element induction relays, the effect of the harmonics of the rectified current need not be feared. It is, however, advisable to choose a frequency remote from the most important harmonic of the traction current and to use two-phase feed ».

Mr. BRENTNALL, whilst agreeing with what had been said, states, from own experience, that the frequency of 83.3 c/s has also been used in Great Britain in cases where there are two types of traction or on A.C. traction where there are stray D.C. currents.

Mr. POKROVSKY observes that the frequency of 83.3 c/s is exclusively used where two kinds of traction current are encountered, and Mr. BRENTNALL agrees.

Mr. VAUBOURDOLLE emphasizes the exceptional character of the use of 83.3 c/s track circuits.

Mr. BROUGHALL suggests that the list should commence with the words « for example »; for, if the frequency of 25 c/s is mentioned, it would also be desirable to add the widely used frequency of 75 c/s. *(Assent.)*

Mr. VAUBOURDOLLE is of the opinion that, with 6-phase or 12-phase mercury vapour rectifiers, the harmonics are not so troublesome.

Mr. POKROVSKY quotes actual examples where frequencies of 50 and 100 c/s have been used. In Russia, a frequency of 100 c/s is used.

Mr. RIGHI amplifies the remark of the U.S.S.R. Delegate by drawing attention to the fact that it may happen that one of the phases of a rectifier does not work regularly. This represents a special case which need not give rise to great misgivings when a catenary is fed from two substations in parallel. This effect need, in fact, only be feared if the section is fed by a single rectifier only.

He also points out that, if one would always have to envisage the need for feeding the track circuits by a frequency different from the others, this would entail very considerable costs which would not always be justified.

The CHAIRMAN is wondering what advantage could be obtained from an amendment of the text in this respect which might only give rise to misgivings concerning the safety of the installations.

Mr. POKROVSKY replies that, although the question is very complex, there exists a general principle to ensure safety. Parallel running of substations is not a principle but a working method — and it is the principle we are after. He draws attention to cases where the rails do not carry industrial current; there are other cases where the rails even carry heavy current. It is therefore necessary to be very careful.

Mr. RIGHI mentions that, in the first automatic block installation with coded currents carried out in the United States, a fundamental frequency different from that of the industrial main supply was chosen, especially in regions where parasitic currents at industrial frequency were liable to be encountered. As the industrial frequency in the United States is 60 c/s, a frequency of 100 c/s was, at the outset, often chosen for the track circuits. In Italy, numerous tests have been carried out; but only in rare cases was it found necessary to use a special frequency. The Special Reporter is quite willing to amend his first text but he is afraid, as Mr. VAUBOURDOLLE has already remarked, that such an amendment might do more harm than good.

The CHAIRMAN suggests the following addition to the text : « With two-element induction relays, the effects of the harmonics of the rectified current need not be feared. *However, the choice of frequency must take into acconnt the special condition where harmonics of the same frequency can be produced* ».

— *The Assembly approves the thus amended text, worded as follows :*

« 13. *With D.C. electrification*, the following types of track circuits are used :

«— A.C. feed at industrial frequency (e.g. 25, 42, 50, 60) or, in some special cases 83.3 c/s, using induction relays with two de-phased elements or, sometimes, rectifier relays;

«— A.C. feed at audio, or higher frequencies up to 20 000 c/s or with high tension impulses, obtained by means of electronic apparatus, using appropriate D.C. relays;

«— track circuits with coded currents, using coding and decoding relays;

«— sometimes, for very short track circuits, D.C. feed.

» Where single-rail track circuits are used, a length limitation must be accepted. Certain Administrations take further precautions in order to protect the equipment and to ensure the proper working of the installations. Other Administrations regard these precautions as unnecessary as they do not enhance safety.

» With two-element induction relays, the effects of the harmonics of the rectified current need not be feared. However, the choice of frequency must take into account the special condition where harmonics of the same frequency can be produced. With rectifier relays, the length of the track circuits must be limited.

» The use of protective devices (fuses or discharge gaps) varies greatly as between one Administration and another. »

Summary No. 14 :

14. *With A.C. electrifications*, the following types of track circuits used :

— D.C. feed, using D.C. relays with special characteristics (short-circuit rings or windings), series-connected with inductive elements offering a high impedance to the traction current;

— A.C. feed at 42,75 and 100 c/s for 16 2/3 c/s traction, and at 83.3 c/s for 50 c/s traction, using induction relays with two de-phased elements with two or three positions;

— A.C. feed at frequencies of the order of 1 000 to 20 000 c/s or with high-tension impulses obtained by means of electronic apparatus, using appropriate D.C. relays;

— track circuits with coded currents, using coding and decoding relays.

The feed voltage frequencies are so chosen as to keep away from the frequency of the traction currents and its most important harmonics.

Mr. POKROVSKY asks that the experience of the French Railways and perhaps also that of the Swedish Railways should be taken into account as regards two-phase feed using two-element induction relays. To the Russian Railways, this is a very important method, and the French experience is highly interesting.

Mr. WALTER replies that this must be regarded as an interesting and necessary peculiarity of the 83.3 c/s connection.

There is a two-phase distribution along the line, fed direct from the substation.

Mr. RIGHI would like to add, to the suggestions already put forward, that stress should be laid on the fact that the two elements of the same relay must not be fed from the same phase. A feed from the same phase would not even be possible, and any link between the two phases must be avoided.

Mr. KARSBERG can see no point in mentioning relays with two and three positions.

Messrs. BROUGHALL, KARSBERG and POKROVSKY contribute to the re-drafting of the text, and the Assembly agrees to the following wording :

« 14. *With A.C. electrifications*, the following types of track circuits are used :

»— A.C. feed at 42, 75 and 100 c/s for 16 2/3 c/s traction, and at 83.3 c/s for 50 c/s traction, using induction relays with two de-phased elements supplied from two separate phases.

»— A.C. feed at frequencies from audio up to 20 000 c/s or with high-tension impulses obtained by means of electronic apparatus, using appropriate D.C. relays;

»— track circuits with coded currents, using coding and decoding relays.

»— D.C. feed, using D.C. relays with special characteristic (e.g. short-circuit rings or windings), series-connected with inductive elements offering a high impedance to the traction current.

» The frequencies of the supply voltages are so chosen as to keep away from the frequency of the traction currents and its most important harmonics. »

Summary No. 15 :

15. The measures taken to avoid disturbances liable to arise from interference of the traction current with signalling circuits other than track circuits consist in a judicious choice of the type and voltage of the feed, and of the type of equipment.

Two-wire circuits are preferred, without earth connection, and generally with bipolar break.

In the case of A.C. electrifications, it is necessary to take into account possible longitudinal voltages, with a view to the safety of the staff.

Mr. KARSBERG thinks that there is a contradiction between the end of Summary No. 10 and the end of the present Summary; he suggests that the latter should be omitted. *(Assent.)*

Mr. WALTER draws attention to a precaution which is not mentioned in the proposed text and which consists in making sure that, where D.C. relays are used, these are not affected by the induced voltages to which they may be subjected on the part of the traction current. He suggests that a sentence to that effect should be inserted after the first paragraph.

The CHAIRMAN consequently proposes the following text, which is adopted :

« 15. The measures taken to avoid disturbances liable to arise from interference of the traction current with signalling circuits other than track circuits consist in a judicious choice of the type and voltage of the feed, and of the type of equipment.

» In particular when D.C. relays are used, care must be taken to see that they are not affected by the induced voltages to which they may be subjected.

» Two-wire circuits are preferred, without earth connection, and generally with double-pole circuit breaking. »

Summary, No. 16 :

16. As far as the telecommunication lines are concerned, one tries to keep the psophometric electromotive force within the limits recommended by C.C.I.T.T.

The long-distance telephone circuits of the general network are, in many cases, worked with carrier current equipment with a small number of channels, e.g. of the « 3 + 3 » or « 12 + 12 » types which are less sensitive to induction.

Generally, the C.C.I.T.T. recommendations are adhered to.

Mr. SCHOONJANS asks to be allowed to expatiate somewhat longer on the subject and suggests a re-draft of this Summary. This is reproduced at the end.

Mr. DEVILLERS suggests that the essential C.C.I.T.T. recommendations should be appended to the present report.

After an exchange of views between Messrs. LESJANIN, RIGHI, SCHOONJANS and WALTER, the CHAIRMAN decides that an amendment of this kind would give rise to serious drawbacks and that, in the circumstances, a mere reference to the work of the C.C.I.T.T. must suffice.

— *The text adopted is the following :*

« 16. As far as the telecommunication lines are concerned, close adherance to the Regulations and the « Recommendations » of C.C.I.T.T. ensures that both the danger due to induction effects and the psophometric voltages in the circuits will be limited to values which allow normal working. It is, however, always necessary to compensate with care the unbalance capacities of the lines, but the techniques used with cables are, in this respect, well known.

« Carrier equipments, which are very much less sensitive to induction, are moreover being increasingly used for long distance telephone circuits. »

— The meeting is closed at 11.15 a.m.

Meeting on 29th June, 1960.

Chairman : Mr. d'ARBELA

— The meeting is opened at 9 a.m.

The CHAIRMAN causes the Summaries to be read out a second time in the form in which they have been revised as a result of the modifications agreed during the discussions at the previous meetings.

— *No comments were made.*

The CHAIRMAN expresses his warm thanks to the Delegates who, through their presence, through their unremitting attention at the meetings, and through their contribution to the discussions, had furthered the solution of the question which Section I had been asked to study.

He expresses his special thanks to the Reporters, Messrs. RIGHI, BROUGHALL and SVENSSON, for the important contribution they had made to the success of this session, and to the Secretaries, Messrs. SCHOONJANS and BERESFORD.

— The meeting is closed at 9.45 a.m.

— *The final complete text of the Summaries relating to Question 1 is reproduced below on pages 948 to 953.*

SECTION III. — Working.

[656 .225]

QUESTION 3.

Transport on railway wagons of road-lorries and trailers loaded with goods.

Questions arising from this mode of transport :

- **The role of the road-hauliers;**
- **Tariffs to be applied;**
- **Characteristics of the railway rolling stock to be employed;**
- **Installations for loading and unloading;**
- **Use of single wagons, or of sets of wagons, or of complete trains for this kind of transport.**

Results already obtained and possibilities of extending this mode of transport.

Preliminary documents.

Report (*America (North and South), Australia, Burma, Ceylon, Egypt, Federal Republic of Germany, Ghana, India, Indonesia, Irak, Iran, Republic of Ireland, Japan, Malaya, Netherlands, New Zealand, Norway, Pakistan, Philippines, South Africa, Sudan, Sweden, United Kingdom of Great Britain and Northern Ireland and dependent overseas territories, Union of Soviet Socialist Republics*), by Dr. G. SCHRADER. (See *Bulletin* for January 1960, p. 1.)

Report (*Austria, Belgium and Belgian Congo, Bulgaria, Cambodia, Czechoslovakia, Denmark, Ethiopia, Finland, France and French Union, Greece, Hungary, Italy, Lebanon, Luxemburg, Poland, Portugal and overseas territories, Rumania, Siam, Spain, Switzerland, Syria, Turkey, Viet-Nam, and Yugoslavia*), by L. LOHIER. (See *Bulletin* for February 1960, p. 105.)

Special Report, by L. LOHIER. (See *Bulletin* for June 1960, p. 521.)

SECTIONAL DISCUSSION.

Meeting on 27th June, 1960 (afternoon).

Chairman : Dr. F. SCHELP, *Mitglied des Vorstandes und Präsident der Deutschen Bundesbahn, Member of the Permanent Commission of the Association.*

— The meeting is opened at 2.30 p.m.

The CHAIRMAN welcomes the Delegates and submits, on behalf of the Permanent Commision, the following nominations for constitution of the Section Bureau :

— as *Vice-Chairman :*

Dr. M. SCHANTL, Director-General of the Austrian Federal Railways, Member of the Permanent Commission of the Association;

— as *Principal Secretary :*

Mr. A. MARCHAL, Ingénieur Principal, Belgian National Railways;

— as *English-language Secretary :*

Mr. G. PICKERING, British Railways.

— *The Section indicates assent.*

The CHAIRMAN emphasizes the importance of the problem under review, and congratulates the Reporters and the Special Reporter on the considerable work accomplished by them.

He then calls upon Mr. LOHIER, *Special Reporter*, to sum up the Report which he had prepared in collaboration with Dr. SCHRADER.

Mr. SJÖBERG (*Swedish State Railways*) would like to regard the road-rail systems as nothing more than one of the important means of introducing railway techniques into a rationalized overall organisation of transport. The gist of the problem is the transhipment of the goods from one means of transport to another. The key to a satisfactory solution is the standardisation and unification of conditioning and handling.

Mr. LOHIER, *Special Reporter*, then reads out Summary No. 1 of the chapter entitled « *The advantage of carrying road vehicles loaded with goods by rail* » :

1. The Administrations in general consider that the transport by rail of road vehicles loaded with goods has undoubted advantages for the railway traffic (at least as regards international traffic in the case of those railways where such transport is not possible internally on account of the short distances involved).

The Administrations operating to this formula or who have made trials of it are generally in favour of extending it.

The essential motives for their interest in this formula are :

a) it is an excellent solution of the door to door problem;

b) the technical co-ordination of rail and road brings back long distance traffic to the railway and relieves congestion on the roads.

Mr. DISCRY (*Belgian National Railways*) believes that, if internal traffic on networks of small size is excluded, it would also be necessary to exclude international traffic over short distances.

Mr. CUTTICA (*Italian State Railways*) considers that rail-road transport is advantageous for certain values of the ratio of rail distance and road distance.

Mr. THORHAG (*Swedish State Railways*) expresses the wish that the text of the Summary should not lose sight of the fact that, where there is a choice, the railway administrations still prefer transport by complete wagon loads. One condition which, though indispensable, is difficult to fulfil in rail-road traffic is that of rapid forwarding.

The CHAIRMAN thinks that speed is not the only factor. Economy in man-power is essential. If road hauliers accept the handling of terminal road transports and cease to put up an unfair competition with the railways, they would permit the introduction of rail-road services even over medium distances.

Mr. SANTORO (*Italian State Railways*) is of the opinion that Summary No. 1 should remain confined to generalities, without pronouncing on the advantages and disadvantages of the rail-road system.

Mr. RAYMOND (*British Railways*) asks whether it could be agreed to substitute, for the sentence in brackets, some such wording as « inasmuch as distance and load conditions are favourable ».

The CHAIRMAN remarks that, in the United States, rail-road transport is used even over relatively short distances. In the last resort, the application of this technique depends on all the relevant transport conditions, and not on distance alone. In fact, if the wording is to be changed, it might be preferable to say « under given conditions ».

Mr. RAYMOND believes that, in practice, the choice of the mode of transport is governed by economic conditions. As far as he is concerned, all he would like to do is to eliminate the case of international traffic over short distances.

Mr. DAUDEMARD-GRÉGNAC (*French National Railways*) is also of the opinion that this is the only debatable point in the text submitted to the Assembly.

Mr. SANTORO distinguishes between two important points in Summary No. 1, viz. :

— is the rail-road formula desirable or not ?

— if it is desirable, does this apply to transport distances of 100, 500 or 1 000 km ?

This second point is dealt with in Summary No. 15. Summary No. 1 should be confined to the first point. The formula is highly desirable. Under what conditions ? This will be the subject of another summary.

It is therefore sufficient to leave out the words in brackets.

— The Assembly indicates its approval of this proposal, and the new text of Summary No. 1 is as follows :

« 1. The Administrations in general consider that the transport by rail of road vehicles loaded with goods is of great interest to the railways.

« The Administrations operating to this formula or who have made trials of it are generally in favour of extending it.

« The essential motives for their interest in this formula are :

« *a*) it is an excellent solution of the door to door problem;

« *b*) the technical co-ordination of rail and road brings back long-distance traffic to the railway and relieves congestion on the roads. »

Summary No. 2 :

Organisation of the service, part to be played by the road transport undertakings.

2. In carrying out such services, two formulae have been used :

a) service assured from one end to the other by the railway;

b) service assured by the road transport undertaking, which hands over the vehicle to the railway for the journey by rail.

The first formula has the advantage of giving the railway complete control over the traffic, and assuring direct contact with the clients, with the possibility of encouraging them to the greatest possible extent to make use of the most advantageous method : wagon or the rail-road formula. It is valuable in particular in those countries where the railway is authorised to run road services.

The second formula leaves control of the traffic in the hands of the road transport undertakings for whom the railway merely provides the rail transport. It has the advantage in those countries where public road transport undertakings are licensed on a quota basis, of diverting to the railway part of the road transport potential in the case of transport carried out for a third party which would continue to go by road if the railway would only carry out transport over the whole run; it also attracts private transport which, in the case of the first formula, would not be entrusted to the railway.

The choice between the two formulae is therefore a function of the ruling system governing the railways and the roads in each country, as well as of the possibilities of collaboration between the railway and the road transport undertakings, and the advantage of such collaboration for the railway.

Mr. THORHAG states that Sweden is about to introduce, this autumn, a rail-road service where the terminal transport will be undertaken by a subsidiary road haulage undertaking.

The CHAIRMAN likens this case with the one referred to under (*a*) of the proposed text.

Mr. WANSINK (*Netherlands Railways*) is likewise of the opinion that the case of a railway subsidiary falls under (*a*).

Dr. KRÜGER (*German Federal Railway*) believes that, in the Netherlands, consignments are contracted with Messrs. Van Gend & Loos, and that this case should fall under (*b*).

Mr. ROUSSEAU (*International Union of Railways*) suggests that, in order to overcome the difficulty, the notion of carrying out a service should be abandoned in favour of that of the relationship with clients. This is, in one case, maintained by the railways and, in the other case, by the road hauliers who hand over their vehicle to the railway for the rail journey.

Mr. LOHIER suggests that the wording of point (*a*) should be redrafted as follows :

« Service assured from one end to the other under the responsibility of the railway » and that the beginning of the last paragraph should also be changed to read as follows :

« The possible application of one or the other of the two formulae... ».

Mr. GUIBERT (*French National Railways*) suggests a minor alteration in the second sentence of the last-but-one paragraph : « It has the advantage, *especially* in those countries... ». For, the advantage referred to may also be apparent in those countries where public road transport is not licensed.

— *The Assembly indicates its approval of these suggestions, and the next text of Summary No. 2 is re-drafted as follows :*

« 2. In carrying out such services, two formulae have been used :

« *a*) service assured from one end to the other under the responsibility of the railway;

« *b*) service assured by the road transport undertaking, which hands over the vehicle to the railway for the journey by rail.

« The first formula has the advantage of giving the railway complete control over the traffic, and assuring direct contact with the clients, with the possibility of encouraging them to the greatest possible extent to make use of the most advantageous method : wagon or the rail-road formula. It is valuable in particular in those countries where the railway is authorised to run road services.

« The second formula leaves control of the traffic in the hands of the road transport undertakings for whom the railway merely provides the rail transport. Above all, it has the advantage in those countries where public road transport undertakings are licensed on a quota basis, of diverting to the railways part of the road transport potential in the case of transport carried out for a third party which would continue to go by road if the railway would only carry out transport over the whole run; it also attracts private transport which, in the case of the first formula, would not be entrusted to the railway.

« The possible utilisation of one or other of these two formulae is therefore a function of the ruling system governing the railways and the roads in each country, as well as of the possibilities of collaboration between the railway and the road transport undertakings, and the advantage of such collaboration for the railway. »

Summary No. 3 : Technical questions.

3. The chief formulae which have been used or tried are :

a) transporting an ordinary road vehicle on a standard type wagon;

b) transporting a special type of road vehicle on a standard type wagon;

c) transporting a standard type of road vehicle on a special type of wagon;

d) transporting a special type of road vehicle on a special type of wagon;

e) combined rail-road vehicle.

Mr. Borer (*Swiss Federal Railways*) points out that, by virtue of its terms, the question under discussion is limited to « transport on railway wagons of road lorries and trailers loaded with goods ». Should the combined rail-road vehicles, which are classified in a different category by the United Nations Commission, appear at all in the present Summaries ?

Mr. Lohier considers that the investigation would be incomplete if, for merely formal reasons, one would exclude a closely related technique designed for the same purpose.

Mr. S.C. Harvey (*British Railways*) specially asks for the combined rail-road vehicles to be retained since these, because of the smaller loading gauge of British Railways, are the only ones among the systems named which have a chance of being introduced in this country where great importance is attached to them. Prototypes have been constructed which have already been tried out on the roads and will soon be tried out on the railway.

Dr. Schrader (*German Federal Railway and Reporter*) recalls that paragraph (*b*) refers to a « special type of road vehicle ». Often, however, this is no longer a « vehicle » but just a box without any rolling gear. The expression « part of a road vehicle » would seem to be preferable, and would serve as a clear distinction from the container.

Mr. GUIBERT suggests that, in paragraphs (*b*) and (*d*), the words « special type of road vehicle » should be amplified by « with or without rolling gear ».

— *The Assembly indicates its approval, and the new text of Summary No. 3 is as follows :*

Technical questions.

« 3. The chief formulae which have been used or tried are :

« *a*) transporting an ordinary road vehicle on a standard type wagon;

« *b*) transporting a special type of road vehicle, with or without its running gear, on a standard type wagon;

« *c*) transporting a standard type of road vehicle on a special type of wagon;

« *d*) transporting a special type of road vehicle, with or without its running gear, on a special type of wagon;

« *e*) combined rail-road vehicle. »

Summary No. 4 :

4. The first formula is obviously the most satisfactory. It is widely used in North America, but is not possible in Europe owing to the dimensions of the railway loading gauge.

Mr. SANTORO asks if Mr. LOHIER really believes that the first formula is the most satisfactory. Is this from an economic point of view, or is it its simplicity which tempts the Special Reporter ?

Mr. LOHIER points out that the draft summaries reflect the opinion of the Reporters. The formula which consists in taking any normal type flat wagon and putting on it any type of road vehicle is *a priori* the most satisfactory solution, both because of its simplicity and from an economic point of view.

Dr. GAEBLER (*German Federal Railway*) points out that it is proposed to state that the first formula is not possible in Europe. This statement is too categorical.

Mr. THORHAG supports this point of view and refers to the case of Sweden where the loading gauge permits the use of the first formula.

Mr. BORER also lends support to this point, recalling the transport of ordinary road vehicles on ordinary railway vehicles through the Gotthard Tunnel.

Mr. GUIBERT suggests that the draft should be altered to read : « ... but is generally not possible in Europe ».

— *The Assembly indicates its agreement with the following new text of Summary No. 4 :*

« 4. The first formula is obviously the most satisfactory. It is widely used in North America, but is very often not possible in Europe owing to the dimensions of the railway loading gauge. »

Summary No. 5 :

5. The fifth formula is attractive, but raises delicate problems owing to the difficulty of reconciling the road and railway techniques and regulations (weight, dimensions). In addition, it would appear that it could only be adopted in cases where the railway itself carries out the transport from end to end.

Dr. GAEBLER declares that the combined rail-road vehicle can be a privately owned vehicle. In his opinion the last sentence should therefore be omitted.

The CHAIRMAN thinks it rather unlikely that a road haulier should acquire such a specialized vehicle. The vehicle should at least be supplied by the railway.

Mr. LOHIER believes that one would be led away too far if one had to define, in Summary No. 5, the cases favourable to the application of the fifth formula in a manner which is, at the same time, fairly general and fairly precise. For their part, the Reporters had deliberately confined themselves to a concise and restrained statement. But if the Assembly has any misgivings, the Reporters would have no objections to the proposal put forward by Dr. GAEBLER.

— *The Assembly concurs with this point of view, and the new text of Summary No. 5 is as follows :*

« 5. The fifth formula is attractive, but raises delicate problems owing to the difficulty of reconciling the road and railway techniques and regulations (weight, dimensions). »

— The meeting is closed at 5.15 p.m.

Meeting on 28th June, 1960 (morning).

Chairman : Dr. SCHELP.

The CHAIRMAN opens the meeting at 9.10 a.m., and asks the *Special Reporter* to read out Draft Summary No. 6.

Summary No. 6 :

6. The three other formulae each have their advantages and drawbacks. Various considerations affect the choice to be made between them.

The loading and unloading of the road vehicle on the wagon must be as rapid as possible, so as to speed up the transport of the goods.

The amount and cost of the capital invested in the stock tends to avoid specialisation of both road and railway stock as much as possible.

The cost of the transport leads to endeavour to have as low as possible a dead weight for both road vehicles and wagons, and the greatest possible load and useful volume, taking into account technical exigencies (loading gauge, weight on rail, weight on road). This generally leads to preference being given to road semi-trailers (in conjunction with automatic centering on the wagon), the use of which is being extended on the roads of Europe, whilst they are almost exclusively used in America for long distance traffic.

— *This text is adopted without alteration.*

Summary No. 7 :

7. It is therefore permissible to think that, in those countries where the formula of agreements with the road transport undertakings is adopted (formula *b* of point 2), it is best to adopt a system allowing of the use of a standard type of road semi-trailer which will only require very slight modification. This is the third formula which is adopted in the United States (Clejan). Germany (low-loader wagon) and France (S.E.G.I. low-loader wagons and Kangaroo wagons).

In addition, the use of semi-trailers has the advantage of avoiding transporting the tractor and road driver, who remain at the operating centre.

Mr. THORHAG states that, for their forthcoming scheme, the Swedish railways have, after enquiries in the United States, adopted the Clejan system, subject to minor modifications for its adaptation to Swedish conditions.

Mr. LOHIER agrees that the Clejan system is of great importance in the United States because of the wide loading gauge of the U.S. railways. Sweden is certainly also in a favourable position in this respect. But, as far as the Continent of Europe is concerned, it would seem desirable to take international traffic into account which is governed by a fairly restrictive general loading gauge.

Mr. THORHAG states that his country wishes to carry out a trial internally and that the only system at present suitable for this purpose was found to be the Clejan system. He by no means maintains that this will be the system of the future. He personally is in favour of the large container, and if he could use the latter in conjunction with the Clejan system, he would be perfectly satisfied.

Mr. LOHIER believes that the proposed draft Summary No. 7 should fully satisfy Mr. THORHAG. It foresees the use of semi-trailers, which would include the Clejan system. Moreover, the container problem does not form part of the question under review, and this technique is not relevant to the formula of collaboration with the road transport undertakings and the use of standard type road vehicles, covered by Summary No. 7.

In any case, whilst each country remains fully at liberty concerning the choice of methods for domestic purposes, it is opportune to outline the principles which it would be desirable to adopt on the international level.

— The Assembly concurs in these views, and the text of Summary No. 7 is adopted without modification.

Summary No. 8 :

Loading and unloading installations.

8. The loading and unloading installations depend upon the rail-road system selected.

Such installations must allow of a rapid change-over from rail to road and vice versa, which at the present time is only assured by self-contained transfer systems. In this connection, the use of some system of guiding the semi-trailers when loading them on the wagons considerably facilitates obtaining such a result.

The capital investment must be limited to the essential minimum needed to enable all the stations where it is desirable to load and unload road vehicles to be so equipped.

The use of mobile loading ramps, which can easily be moved about and used with the minimum of alteration to the station would appear a solution to be recommended whenever it is technically possible.

Mr. LOHIER emphasizes the importance of reducing the loading and unloading times, as the road hauliers very often arrive only a very short time prior to the departure of the train and wish, on arrival, to recover their vehicle as soon as possible. The Special Reporter thinks that a train with 30 to 35 wagons should be capable of being loaded in less than an hour. According to French experience, this means that the road vehicles must move on the railway wagons under their own power and that, in the case of semi-trailers, a guiding system must be used. In France, the loading of a semi-trailer does not take longer than between 1 1/2 and 2 minutes.

Mr. THORHAG expresses reservations on the subject of « mobile loading ramps which can easily be moved about ». He thinks that such ramps are either difficult to handle, or prohibitively expensive.

Mr. Lohier asserts that French experience is absolutely reassuring in this respect. Anyone can go there and convince himself.

— *On the suggestion of the* Chairman, *the text of Summary No. 8 is adopted without modification.*

The Assembly then turns to the chapter: « *Carrying out the transport* (*single wagons or complete trains*) ».

Summary No. 9 :

9. Sending forward by complete train has great advantages by giving a shorter transport time and lowering the cost for the railway.

This is the method to be recommended whenever the traffic is sufficient; it involves limiting the number of stations where such traffic can be accepted, with the corollary that the terminal road hauls will be increased.

— *This text is adopted without modification.*

Summary No. 10 :

10. Sending forward by single wagon (or groups of wagons) meets the case when the traffic is insufficient to form complete trains; it allows a great many stations to be served and limits the terminal road hauls to short distances; the wagons must be sent on by fast goods trains in order to assure that the transport time remains competitive.

— *Adopted.*

The Assembly then passes on to the examination of the chapter : « *Terminal road runs* ».

Summary No. 11 :

11. These services are assured either by the railway or by road hauliers, according to the operating formula adopted. Certain Administrations limit the length of the terminal road runs; such restrictions may also be the result of the road traffic regulations in force in the country in question.

In general, the drivers do not travel with the road semi-trailers carried by rail, so that it is an advantage to provide road transport organisations at the terminal stations. Such organisations can be set up either by the railway or by the road transport undertakings.

— *Adopted.*

The Section then turns to the chapter : « *Tariffs* ».

Summary No. 12 :

12. When the railway works the traffic from end to end, it charges clients directly a transport rate which may be either a door to door tariff (for example the road tariff if there is one) or the railway rate plus a haulage charge.

— *This text is adopted without modifications.*

Summary No. 13 :

13. If the railway is merely providing transport for a road transport undertaking, it has no direct contact with clients and charges the road firm a rate for the railway journey.

In view of the special features of this traffic, and according to the tariff formula adopted by most of the Administrations, who have experience of this kind of transport, it is recommended to establish the rate independently of the kind of goods and base it on the road costs, taking into account the distance of the transport and the gross weight of the vehicle.

The tariffs should be profitable to the road transport undertakings who regularly send vehicles over a given journey and thus allow of a traffic programme being established.

In Mr. SANTORO's opinion, it is essential to mention that the tariffs should avoid the risk of transferring traffic already carried by the railways by conventional means.

Mr. LOHIER states that, according to French experience, the adoption of tariff rates independent of the kind of goods has, for ten years, secured for the rail-road transport system a traffic which used to be carried almost exclusively by road. He does not deny that there have been also certain transfers. But they concern a traffic which, in the absence of the rail-road service, may have left the railway altoghether. In the opinion of the Special Reporter, the transfers experienced do not impair the principle of adopting tariff rates independent of the kind of goods.

Mr. SANTORO, however, would like to specify certain limits for adopting tariff rates independent of the kind of goods, and would also like to see a reference in the Summary concerning the need for avoiding the transfer of non-vulnerable traffic. He thinks that the criterion of good tariffs is the promotion of the best technical solutions. Moreover, if the rates must be adjusted for competitive reasons, it is preferable to modify the ordinary rates first.

Mr. RAYMOND thinks that these problems are of a commercial and competitive nature and that it would therefore be difficult to embody them in a Summary. It is necessary to preserve a high degree of flexibility in the question of tariffs. The principal objective of the railway administrations should be to recover lost traffic. The possibilities of re-using the vehicles on trips between two given points are of such decisive importance that it is difficult to lay down any general rules for the tariffs. He would be satisfied if mention is made in the Summary of the importance of the competitive position in relation to road transport.

Mr. LOHIER remarks that the railway tariffs should be contained between two limits : — the cost price, and the rates charged by competitors.

As far as the cost price is concerned, it can be postulated :

— that the tariff should be reasonably profitable to the railway, and

— that it is preferable to recover traffic, if possible, by those means which cost least, i.e. by conventional means.

As far as the competitive position is concerned, this position varies as between one point-to-point relation and another, and may lead to the adoption of different tariffs for each such relation.

In order to meet these views which, he believes, are shared by the Assembly, the Special Reporter suggests the addition of the following text at the end of the second paragraph :

« ... taking into account the distance of the transport, the gross weight of the vehicle, and the competitive position in the relation concerned. The tariffs applied should, of course, ensure a reasonable profitability of the service and should avoid unwanted shifting of traffic already carried by the railway ».

— *This proposal is adopted so that the text of Summary No. 13 now reads :*

« 13. If the railway is merely providing transport for a road transport undertaking, it has no direct contact with clients and charges the road firm a rate for the railway journey.

« In view of the special features of this traffic, and according to the tariff formula adopted by most of the Administrations, who have experience of this kind of transport, it is recommended to establish the rate independently of the kind of goods and base it on the road costs, taking into account the distance of the transport, the gross weight of the vehicle and the competitive position on the route concerned. The applied tariff, of course, has to assure a reasonable profitability of the transport and to avoid any transfer of existing railway traffic.

« The tariffs should be profitable to the road transport undertakings who regularly send vehicles over a given journey and thus allow of a traffic programme being established. »

The Assembly now passes on to the examination of the Summaries of the chapter : « *Future prospects* ».

Summary No. 14 :

14. In North America, where the very large railway loading gauge facilitates solving the technical problems of railroad traffic, this kind of traffic is already very extensive.

The experience of European railways (D.B. and S.N.C.F.), who have already perfected certain solutions to the technical problems raised by a smaller loading gauge, shows that there is also a potential for such traffic in Europe.

— *This text is adopted without amendment.*

Summary No. 15 :

15. In any case, we should not expect to get such traffic to the railway in the case of small distances. The minimum distance to be taken into account may be fixed at something like 300 to 400 km.

The Chairman believes that there are, especially where regular traffics are involved, cases of profitable rail-road transports over shorter distances of, say, 250 km. He suggests that the text be amended by inserting the word « generally ».

Mr. Cuttica reverts to the remark made by him at the previous day's meeting. In his opinion, the profitability limit of the rail-road technique is governed not only by the overall distance of the transport but rather by the ratio of rail transport and road transport distances.

Mr. Lohier, whilst sharing Mr. Cuttica's opinion, finds it difficult to put it in a precise form. He thinks that the rail transport distance is the primary factor whilst the road distance plays a part within a certain radius around the departure and arrival stations. There is no room for doubt in the case of very short and very long distances, but it is not easy to lay down, with any degree of precision, a limit for transports in the intermediate range.

Mr. Discry, interpreting Mr. Cuttica's remark, suggests that, in the first sentence, the last words should read « small railway distances » instead of « small distances ».

Mr. Borer mentions the special case of Alpine tunnels where the transport of lorries over distances of no more than 15 to 20 km is an economic proposition.

Mr. WANSINK thinks that one would take a somewhat too narrow view of the problem if one were to make the economic range of combined transport dependent on the ratio of road transport and rail transport distances. The competitive position is, in fact, governed by a whole series of factors.

The CHAIRMAN suggests that the proposed text should be adhered to, except for the addition of the word as suggested by Mr. DISCRY.

— *The Assembly concurs, and the new text of Summary No. 15 reads as follows :*

« 15. In any case, we should not expect to get such traffic to the railway in the case of short rail hauls. The minimum distance to be taken into account would generally be from about 300 to 400 km. »

Summary No. 16 :

16. As a result, in the case of regions which are parcelled up politically as they are in western Europe, full expansion of such traffic can only be obtained with formulae for international transport.

— *Adopted without modification.*

Summary No. 17 :

17. Owing to the same political divisions, there is a risk of different solutions coming out for the technical problems raised by the small loading gauge. The heterogeneousness of the solutions will act like a brake on any growth of the traffic; to encourage such growth it would be desirable for the railways to co-ordinate their efforts and adopt a common solution, or if this is not possible, at least only a very limited number of technical formulae which will allow of traffic exchanges between all the countries concerned and the use of the same terminal installations.

Mr. CREM (*Belgian National Railways*) mentions the research carried out by his administration in regard to wagons with small-diameter wheels. This solution, however, gives rise to certain technical objections : — running over points and crossovers; speed restrictions. Mr. CREM asks if the replies to the questionnaire enable the Reporters to form an opinion as to whether it will be possible, one day, to adopt small wheels generally, and thus to eliminate the present obstacle of the restrictive international European loadind gauge which precludes the admission of ordinary road vehicles.

Mr. LOHIER indicates that the questionnaire did not invite the administrations to comment on this point. French experience in the sphere of small-diameter wheels has so far not been conclusive. The need for using bogies, thus increasing the weight of the vehicle, and the need for speed restrictions are serious handicaps compared with wagons with two normal axles.

Mr. CREM does not wish to regard these objections as final; this would be tantamount to abandoning the very formula of combined transport recommended in the Summaries. He would wish that the study of the problem of small-diameter wheels should be actively pursued on the international level.

Mr. CUTTICA declares that this question is at present being studied. It is a question of stresses on the rail which is subjected to more concentrated forces; it is also a question of the weight and cost of the vehicle, the bogie being indispensable if a reduction of the payload is to be avoided.

The technical working party charged with the examination of this question is due to submit its report in September 1960.

Dr. Gaebler reports on German experience. With bogies, there is no danger of derailment, even at high speeds.

Mr. Lohier recalls that there also exists a commercial working party studying the problem of combined transports on the international level.

In the present discussion, the Reporters have not, in spite of the abundant material collected, regarded themselves as being in a position to find « the » solution. On the other hand, they regard it as essential to find a common solution before some railways are considering going ahead with individual solutions.

The Chairman considers that the exposition of the different points of view during the debates has been highly instructive. He emphasizes the importance of a rapid continuation of the studies on an international level. He suggests that the proposed text be adopted.

— *The text of Summary No. 17 is adopted without modification.*

Summary No. 18 :

18. For the rail-road formula to succeed, it is essential for the railway to assure as close a collaboration as possible with the road transport undertakings. Such collaboration may take very varied forms, such as contracts made between the railway and the road transport undertakings, organisations in which the Railway Administrations and the road haulage firms share in working the combined rail-road transport.

Mr. S.C. Harvey stresses the need for wholehearted collaboration on the part of the staff, both of the railways and of the road hauliers. In all their efforts to extend the rail-road services, British Railways have come up against a very understandable distrust on the part of the staff confronted with a competitive mode of transport.

Mr. Lohier would like to avoid talking of distrust in the Summary. He would prefer to express the wish that a climate of mutual confidence exists.

Mr. Sjöberg would like to add the word « understanding » to « collaboration ».

Mr. S.C. Harvey amplifies his previous remark by stating that he had the mutual confidence between management and staff in mind.

Mr. Wansink is of the opinion that « mutual confidence » would merely be a useless repetition of what was already said in the proposed text about « as close a collaboration as possible ».

Moreover, he does not think it advisable to refer to confidence between management and staff. This must, in practice, be created, but it should not be mentioned in the present Summaries. Here, the reference should be confined to mutual confidence between road hauliers and railwaymen.

Mr. Lohier suggests that these considerations should merely be recorded in the report of the meeting.

— *This suggestion is adopted, and the text of the Summary is approved without modification.*

Summary No. 19 :

19. The fact that the rail-road transport formula is favourable for the general economy justifies on the part of the Governments the setting up of equitable customs and fiscal regulation measures suitable to facilitate its development on the national and international plane.

Mr. WANSINK asks the Special Reporter what measures are in mind in this Summary.

Mr. LOHIER gives some examples. As regards customs regulations, the opening to international traffic of frontier posts not at present open for such traffic. As regards fiscal measures in France, the exemption of rail-road trailers from the special taxes imposed on long-distance road transports. As regards regulations, any equitable measure on the part of the governments in favour of the new technique.

Mr. THORHAG declares that combined transport is a necessity. There is a clientele demanding door-to-door transport, and it is in the general interest to satisfy this demand. This provides justification for appropriate government measures.

— *The text of Summary No. 19 is adopted without modification.*

The CHAIRMAN states that the Assembly had concluded the task with which it had been entrusted. He repeats his congratulations to Mr. LOHIER, *Special Reporter* and Dr. SCHRADER, *Reporter*. He thanks the Principal Secretary and Secretary, the typists and the interpreter who had accomplished a thankless task with enormous competence. (*Applause.*)

Mr. WANSINK, speaking for the Assembly, thanks Dr. SCHELP for his combination of patience, tact and firmness with which he had presided over the session, and which enables the Delegates to leave the meeting with the impression that fresh progress had been made in the study of a problem which is as difficult as it is important to the future of the railway. (*Applause*).

— The meeting is closed at 11.30 a.m.

— *The final complete text of the Summaries relating to Question 3 is reproduced on pages 954 to 958 of this Bulletin.*

SECTION IV. — General.

[385 .58]

QUESTION 4.

What steps can be taken to develop and maintain co-operation between management and staff to improve productivity? What scope is there for work study and incentive schemes?

Preliminary documents.

Report (*Austria, Belgium and Belgian Congo, Bulgaria, Cambodia, Czechoslovakia, Denmark, Ethiopa, Finland, France and French Union, Greece, Hungary, Indonesia, Italy, Lebanon, Luxemburg, Poland, Portugal and overseas territories, Rumania, Siam, Spain, Switzerland, Syria, Turkey, Viet-Nam and Yugoslavia*), by E.M. ARYS. (See *Bulletin* for March 1960, p. 203.)

Report (*America (North and South), Australia, Burma, Ceylon, Egypt, West Germany, Ghana, India, Irak, Iran, Republic of Ireland, Japan, Malaysia, Netherlands, New Zealand, Norway, Philippines, South Africa, Sudan, Sweden, Union of Socialist Soviet Republics, United Kingdom of Great Britain & Northern Ireland and dependent overseas territories*), by Edgar J. LARKIN. (See *Bulletin* for March 1960, p. 229.)

Special Report, by E.J. LARKIN. (See *Bulletin* for June 1960, p. 534.)

SECTIONAL DISCUSSION.

Meeting on 27th June, 1960 (afternoon).

Chairman : Sir JOHN BENSTEAD, *Deputy Chairman of the British Transport Commission, Member of the Executive Committee of the Association.*

— The meeting is opened at 2.30 p.m.

The CHAIRMAN welcomes the Delegates and submits, on behalf of the Permanent Commission, the following proposals for composition of the Section Bureau :

— as *Vice-Chairman :*

Mr. R. GUIBERT, Directeur Général Adjoint, French National Railways, Member of the Permanent Commission of the Association;

— as *Principal Secretary :*

Mr. W. VAN RIJN, Ingénieur Principal, Belgian National Railways, Technical Secretary of the Association;

— and as *English-language Secretary :*

Mr. S. CAHILL, Córas Iompair Eireann.

— *These proposals are approved.*

The CHAIRMAN thanks the two Reporters, Messrs. E.J. LARKIN and E.M. ARYS, and asks Mr. LARKIN (*Special Reporter*) to summarize his Special Report.

The CHAIRMAN then proposes to discuss the Summaries of the Special Report one by one.

Summary No. 1 :

1. It is generally agreed that of the factors contributing to increased productivity, the human factor is the most important.

Experience has shown that a passive attitude on behalf of the staff can not only retard but even prevent any increase in productivity which is otherwise technically possible.

Mr. K. SINGH (*Railway Board of India*), subsequently supported by Mr. BLEE (*British Railways*), expresses the wish that reference should be made to the fact that the part played by the leaders is particularly important in seeking to increase productivity. Special attention should therefore be paid to the selection and training of leaders.

In the CHAIRMAN's opinion, this suggestion is covered by Summary No. 2. He does, however, propose to amend the text of Summary No. 1.

After interventions by Mr. RATTER (*British Transport Commission*) and Mr. VALDIVIESO (*Italian State Railways*), concerning the expressions to be used, the CHAIRMAN asks Mr. LARKIN to re-draft the wording for the next meeting.

Summary No. 2 :

2. The Administrations endeavour to create an atmosphere of confidence by :

— explaining to their staff, the meaning of productivity, the reasons for increasing and the means to achieve it;

— minimizing any disagreeable consequences which may arise temporarily from the changes necessary to increased productivity;

— having their staff participating in one way or another, in the resulting benefit.

Mr. BLEE asks that the staff should be assured of the integrity of management.

The CHAIRMAN suggests that the examination of Summary No. 15 should be awaited. (*Assent.*)

Summary No. 3 :

3. There should be consultation at all levels, particularly were changes affecting individuals are contemplated. Central productivity Councils, on which the highest levels of management and the Trades Unions are represented, are invaluable in maintaining a good atmosphere and keeping the Unions informed at an early stage of management's proposals.

The success of these Councils is enhanced by the setting up of Committees at lower levels.

In the opinion of Mr. GUIBERT, *Vice-Chairman*, it appears to be too stringent to confine relations between management and staff to Trade Union channels. It should also be mentioned that staff representatives also sit in the central Councils.

Mr. SINGH suggests that the words « Trade Unions » should be replaced by « workers ».

The CHAIRMAN proposes that an amended version should be presented by Mr. LARKIN.

Mr. GUIBERT, seconded by Mr. VALDIVIESO and Mr. GSCHWIND (*Swiss Federal Railways*), emphasizes the need for consulting not only the Trade Unions but also the direct staff representatives.

The CHAIRMAN declares that an amended version will be submitted by Mr. LARKIN, but emphasizes that circumstances may differ as between one country and another. (*Assent.*)

Summary No. 4 :

4. A feeling of security is essential. In general, there should be no dismissals due to increased productivity. Any reduction in the establishment of staff should be met by internal wastage, transfers and the curtailment of recruitment, even though planned progress may be temporarily retarded.

Any agreement should provide for staff to be transferred if this is inevitable. Whenever desirable and possible, a change of job and any necessary re-training should be arranged to avoid transfer to another centre.

Mr. GUIBERT calls for a revision of the second paragraph as he is of the opinion that agreements, though desirable, are not indispensable. He emphasizes that this observation is by no means put forward in an anti-social spirit. On the contrary, it is of great importance to ensure the collaboration of the staff. But the staff representatives often tend to concentrate on the immediate repercussions of the proposed measures, and neglect the long term effects.

The CHAIRMAN is of the opinion that the Summary can be modified so that agreement is described as desirable but not as indispensable.

Mr. BURETIER (*Belgian National Railways*) asks whether it would not be possible to recommend entrusting the staff with new works of construction or manufacture in order to avoid the need for re-training.

In the CHAIRMAN's opinion, such a decision would not be opportune in all cases, and should be left to each management. He proposes to move on to the examination of the following Summary. (*Assent.*)

Summary No. 5 :

5. A valuable contribution to increased productivity is for management to provide and maintain well-conceived training schemes for all grades of staff.

Working conditions must be of a good standard. Staff will always respond better if due regard is paid to their personal welfare.

— *In the absence of any observations, Summary No. 5 is adopted.*

Summary No. 6 :

6. Whilst the provision of general productivity indices is often necessary, it is very advantageous that the productivity of small units such as groups of staff at local level should be clearly expressed.

— *In the absence of any observations, Summary No. 6 is adopted.*

Summary No. 7 :

7. There should be good promotional prospects and the promotion schemes should be clearly defined.

Mr. MAASS (*South African Railways*) asks that the word « good » (« bonnes » in the French text) should be omitted.

The CHAIRMAN thinks that the meaning is well expressed by the word « promotion » (« avancement ») but asks the *Reporter*, Mr. ARYS, whether he would like to express an opinion on this subject.

Mr. ARYS thinks that the word « bonnes » (« good ») might be replaced by « raisonables » (« reasonable »).

Mr. MAASS expresses agreement.

The CHAIRMAN suggests that this modification will be adopted.

Mr. SINGH suggests that, in the English text, the word « enough » should be substituted for « reasonable ».

Mr. VALDIVIESO expresses the opinion that promotion is directly related to the organisation of the establishment, to the vacancies arising, and to recruiting conditions and suggests that the first part of the Summary should be omitted.

Mr. BEYNET (*French National Railways*), whilst agreeing with Mr. VALDIVIESO's point of view, suggests the following modification of the Summary :

« It is desirable that there should be sufficient promotional prospects... »

The CHAIRMAN emphasizes that the Summary had been drafted as part of the introduction of work study schemes.

Mr. MAASS is of the opinion that the adoption of the word « reasonable » would meet the point perfectly well.

The CHAIRMAN proposes the adoption of this modification. (*Assent.*)

— *The text of Summary No. 7 becomes:*

« 7. There should be reasonable promotional prospects and the promotion schemes should be clearly defined. »

Summary No. 8 :

8. Suggestion schemes are invaluable for the submission of new ideas by members of the staff.

Mr. HERLIHY (*Córas Iompair Eireann*), suggests that it would be sufficient, in the English text, to say « valuable » instead of « invaluable ».

The CHAIRMAN remarks that the word « précieux » in the French text corresponds to « valuable », and suggests the use of the words « of great value ».

After an intervention by Mr. SINGH, the CHAIRMAN proposes to adhere to the word « valuable », without modifying the French text. (*Assent.*)

Summary No. 9 :

9. The exchange of information in regard to productivity should be encouraged. Small teams to visit projects of common interest would be advantageous.

Mr. VALDIVIESO asks whether it might not be desirable to create, or to adumbrate, a central organisation which would collect all information concerning productivity and to disseminate that information to the interested administrations.

Mr. Dunbar (*British Transport Commission*) thinks that such an organisation would not be justified, and that those interested can always obtain information from other undertakings.

The Chairman recalls that circumstances differ as between one country and another and agrees that the usefulness of a central office would be limited. Each administration will certainly be willing, if requested, to communicate their own work study methods. He proposes to adopt this Summary and to pass on to the examination of Summary No. 10. (*Assent.*)

Summary No. 10 :

10. There is scope for Work Study in every activity associated with a railway undertaking.

— *In the absence of any observation, Summary No. 10 is adopted.*

— The meeting is closed at 4.45 p.m.

Meeting on 28th June, 1960 (morning).

Chairman : Sir John Benstead.

— The meeting is opened at 9 a.m.

The Chairman proposes to pass on immediately to the examination of the remaining Summaries from No. 11 onwards, and to consider all the amendments afterwards.

Summary No. 11 :

11. Work Study provides both a qualitative and a quantitative assessment of the utilisation of equipment and staff in terms which can be universally understood and compared.

Dr. Kolarić (*Jugoslav Railways*) asks that mention should be made, in the Summaries, of the International Work Study Bureau discussed in the Report.

The Chairman remarks that this point had been discussed the day before. After a brief summary of the exchange of views which had taken place on this subject in connection with Summary No. 9, he suggests that the matter should not be raised again. Dr. Kolarić would be able to obtain supplementary information from the Reporters.

Mr. Maass suggests that the word « staff » in the English text should be replaced by « labour » or « manpower » (« main-d'œuvre »).

Mr. Queron (*French National Railways*) thinks that the word « personnel » («staff») is more appropriate than «main-d'œuvre » (« labour ») as it also comprises office staff.

The Chairman is of the opinion that, in the English version, care should be taken not to confuse « staff » with « manpower » as the latter term is more restrictive. He suggests that the word « personnel » should be used in the English text.

Mr. Larkin thinks that the word « personnel », in English, covers the whole body of manual as well as office workers as had been envisaged in the Summary under examination.

The Chairman consequently proposes that the word « personnel » should be adopted for the English version while the

French version remains unchanged. (*Assent.*)

Summary No. 12 :

12. Work Study investigations should be carried out with the full co-operation of the staff.

Mr. DUNBAR remarks that, even if the full co-operation of the staff cannot be secured, this is no reason to forgo a work study investigation.

Mr. GUIBERT, agreeing with this observation, suggests the following re-wording of the Summary :

« Dans les enquêtes d'Etude du Travail, la pleine collaboration du personnel doit être recherchée le plus possible. » (« In work study investigations, the full co-operation of the staff should be sought as much as possible. »)

Mr. VALDIVIESO, in agreement with these remarks, thinks that it should be possible for work studies to be carried out even if the co-operation of the staff is not forthcoming.

Dr. KOLARIĆ suggests that the words « of the Trade Unions and other workers' organisations » should be added.

The CHAIRMAN remarks that the Summaries should be so worded that they remain of general application to all countries.

Mr. GUIBERT suggests that the words « and their representatives » might be added.

The CHAIRMAN consequently proposes the following modified version of the English text :

« In the introduction of work study, the fullest co-operation of the staff and their representatives should be sought », corresponding to the French version :

« Dans les enquêtes d'étude du travail, la pleine collaboration du personnel et de ses représentants doit être recherchée. »

Mr. BLEE suggests that, in the English version, the word « sought » should be replaced by « cultivated ».

Mr. PARES (*French National Railways*) suggests that emphasis should be placed on the fact that increased productivity is also beneficial to the staff.

Mr. GUIBERT, reverting to Mr. BLEE's observation, states that, in French, the word « rechercher » well brings out the meaning of « cultivating » (the co-operation of the staff). As regards the remark made by Mr. PARES, it is, in Mr. GUIBERT's opinion, implied in all the Summaries that productivity is indispensable in the interest of all.

The CHAIRMAN consequently suggests that the end of the wording proposed by him should read, in English : « should be encouraged and sought », corresponding to the French version : « doit être encouragée et recherchée ».

— *The final text will be submitted later on during the meeting.*

Summary No. 13 :

13. It is essential that Work Study personnel should be well trained. If investigations

are carried out by inexperienced staff, the benefits of Work Study will never be realised. It is clear that many more competent Work Study personnel should be trained if tangible progress is to be made.

Mr. VALDIVIESO suggests that the final sentence should be worded as follows :

« Il est clair qu'il y a lieu de former un nombre suffisant de fonctionnaires compétents en matière d'étude du travail si l'on veut réaliser des progrès tangibles. » (« It is clear that a sufficient number of competent officials must be trained in work study matters if tangible progress is to be achieved. »)

Following a remark by Mr. GUIBERT, Mr. BURETIER suggests that, in this version, the word « fonctionnaires » (« officials ») should be replaced by « agents » (« employees »).

The CHAIRMAN suggests that, in the original English version, « many more » should be replaced by « a sufficient number ».

Mr. RATTER asks the Special Reporter, in order to elucidate the point of view expressed in the Summary, whether there is, in fact, a shortage of competent staff at present.

Mr. LARKIN confirms that, with several administrations, work study investigations are not yet undertaken.

Mr. QUERON suggests that the whole Summary should be modified as follows :

« It is essential that work study staff should be available in sufficient numbers, and with good training. If the investigations are carried out by inexperienced staff, it will never be possible to derive advantage from it. »

The CHAIRMAN proposes that the Reporters should be asked to prepare a new version of this Summary.

Summary No. 14 :

14. Providing work measurement is efficiently carried out, incentive bonus schemes are a very good means of improving individual performance; they should be substantial if they are to be effective. Individual incentive systems are more commonly used than group incentive systems. Considering future development, it would appear appropriate that incentive schemes should follow a common pattern so far as each group of grades or activity is concerned, because of the uniformity of railway working.

Mr. FINGER (*German Federal Railway*) expresses the opinion that, before thinking of standardizing the incentive schemes, it would first be necessary, in view of the special circumstances of each railway sytem, to carry out a detailed study of all the relevant national and international conditions.

Mr. GUIBERT supports this remark and suggests that the last sentence should be omitted.

Mr. RATTER asks if the last sentence is to be understood that there ought to be a common pattern between the various groups of a single railway.

Mr. QUERON is of the opinion that such a standardized system would be difficult to conceive in view of the numerous categories of staff involved.

The CHAIRMAN asks Mr. ARYS to elaborate on the meaning of that sentence.

Mr. ARYS states that, in view of the uniform character of railway operation, it did not seem utopic to think that a standardized system of incentives could be adopted on different railway systems, for the same types of jobs.

Mr. GUIBERT thinks that the wish to aim at standardized types of incentives on an international level is bound to give rise to insoluble difficulties.

The CHAIRMAN thinks that it might be possible to adopt the same type of incentives for identical jobs on adjacent railway systems, but that the extension of such a measure on an international level would not be practicable.

Mr. GUIBERT repeats that, since such a measure could only be proposed on a national level, the last sentence should be omitted to avoid confusion.

Mr. BURETIER proposes an amendment concerning the reference to individual incentives. In practice, every workman is dependent on other members of the staff (mechanical handling, maintenance, etc.) in order to achieve a high degree of productivity. It is therefore necessary to create a spirit of solidarity, which can be achieved by means of a collective incentive. The second sentence of the Summary should therefore be amended as follows :

« The incentive system should improve the individual performance and, at the same time, create bonds of solidarity between all the operatives concerned with the execution of the work. »

He also indicates his agreement to the omission of the last sentence of the Summary.

The CHAIRMAN concludes by proposing the ratification of the omission of the last sentence. (*Assent.*)

Mr. DUNBAR thinks that the second sentence is no more than a statement which does not provide any guidance. He suggests that it should be redrafted as follows :

« Individual incentive schemes are usually more effective than group incentive schemes »

The CHAIRMAN asks Mr. LARKIN to express his opinion. The latter suggests that the second sentence should be left as it stands but that the following words should be added :

« ... and the former systems are recommended wherever this is practicable ».

Mr. GUIBERT believes, in agreement with Mr. BURETIER that in addition to the two systems, it is also possible to use a combination of these systems. He therefore suggests that the two systems should not be placed in opposition to each other and that the text should be modified as follows :

« It can be advantageous to use, according to the merits of the case, either the system of individual incentives, or the system of group incentives, or even a combination of the two systems. »

Mr. MAASS suggests that the word « substantial » should be omitted from the first sentence.

Mr. LARKIN points out that low incentives are ineffective.

Mr. MAASS again urges the omission of the word concerned.

Sir BRIAN ROBERTSON (*British Transport Commission*) thinks that the Summary should reflect the meaning of the replies received. He suggests that the second sentence should read as follows :

« Individual schemes are generally more effective, even though there are occasions when it is desirable to have a collective scheme, or combination of the two. »

Mr. BLEE suggests that the following words should be added at the beginning of the first sentence :

« Providing work study and work measurement... »

Mr. LARKIN indicates his agreement with this suggestion.

Mr. DE VOS (*President of the Association, Belgian National Railways*) supports the suggestion made by Sir BRIAN ROBERTSON. In his opinion, it is not necessary to try and obtain unanimous agreement on a text which might lead to the adoption of Summaries which no longer mean anything. The majority opinion of the members should be ascertained. He also thinks that, if the incentives are desired to bring about a certain result, one should also have the courage to say that they must be fairly substantial.

The CHAIRMAN asks for the Section's approval of the rewording of the first sentence :

« Providing method study and work measurement are efficiently carried out... » (*Approved.*)

He then asks whether the word « substantial » could not be retained in view of the opinion expressed by the Reporters.

After Mr. MAASS indicated his agreement to this formula, the Section approved the retention of the word concerned.

The CHAIRMAN then reverts to the question of individual and group incentives.

Mr. VALDIVIESO thinks that, in view of the fact that individual incentives cannot always be applied, the sentence might be modified as follows :

« Although individual incentive schemes cannot always be applied, e.g. in the case of team work, they are generally more effective than group incentive schemes. »

The CHAIRMAN suggests that the Bureau should submit a modified version, taking into account the different points of view expressed.

Mr. QUERON refers to cases where it is not practicable to apply individual incentives. He then reverts to the remark of Mr. BURETIER who, so he understands, proposes to formulate as a recommendation that it might be desirable to go beyond the individual incentive in the direction of an incentive system of a more collective character. (*Mr.* BURETIER *indicates assent.*) He would therefore again propose that, apart from the individual incentive, one should also seek to promote the team spirit so as to achieve a better integration of the staff with their team and their undertaking.

The CHAIRMAN again suggests that the revision of the text should be left to the Bureau, and also proposes that a new Summary should be added at the end in order to take into account, in particular, the suggestion made by Mr. PARES.

Mr. PARES submits to the Section the following two sentences which might be added at the end of the Summaries :

« As the improvement of productivity is, in the long run, beneficial to the greatest number of persons, in spite of the difficulties which is often entails, for a time, in limited sectors, it is not only desirable but in fact indispensable for the railway administrations to take active steps to seek such improvement. It is, however, equally indispensable that this improvement should be sought with a constant care for the personal well-being, and that of their families, of all those who, at whatever level, take part in the life of the railways. »

The CHAIRMAN proposes that the attempt should be made to introduce these remarks in the Summaries.

Mr. BURETIER draws the attention of the Section to the need for watching the quality of the work, especially if the incentives are substantial.

The CHAIRMAN can see no objection to this point being included in the Summaries.

Mr. MAASS indicates his agreement with the remark made by Mr. BURETIER.

Mr. DUNBAR points out that this point is broadly covered by the modification made to the beginning of Summary No. 14.

The CHAIRMAN then proposes to pass on to Summary No. 15.

Summary No. 15 :

15. Whilst the provision of financial incentives is often necessary, good working conditions and good management in creating the proper spirit of understanding are of equal importance.

Mr. VALDIVIESO asks whether it would not be appropriate to modify the end to read : « ... are also necessary ».

Mr. GUIBERT supports this suggestion which should avoid any confusion.

After a brief exchange of views on the purport of this modification between Messrs. GUIBERT, QUERON and PARES, Mr. DUNBAR suggests the wording : « ... are of very great importance ».

— *The latter version is adopted by the Section.*

The CHAIRMAN suggests an adjournment of the meeting to enable the amendments to be drafted.

— The meeting is adjourned at 11.35 a.m.

The CHAIRMAN re-opens the meeting at 12.15 p.m. He suggest that the report should not include the complete text of the discussions. (*Assent.*)

He then asks the Delegates whether they agree to the text of Summaries Nos. 5, 6, 7, 8 and 9, contained in the report of the meeting on the day before.

— *In the absence of further observations, these Summaries are finally adopted.*

The CHAIRMAN then proposes that the meeting should re-examine those Summaries which it had been decided to modify.

Summary No. 1 :

« 1. It is generally agreed that of the factors contributing to increased productivity, the human factor is the most important.

« *Enlightened leadership is all-important* because experience shows that a passive attitude on the part of the staff cannot only retard but even prevent any increase in productivity which is otherwise technically possible. »

Summary No. 3 :

« 3. There should be consultation at all levels, particularly where changes affecting individuals are contemplated.

« *Productivity councils* on which the highest levels of management and *the staff* are represented, are invaluable in maintaining a good atmosphere and keeping *the staff informed at an early stage* of the management proposals.

« The success of these councils is enhanced by the setting up of Committees at lower levels. »

Summary No. 4 :

« 4. A feeling of security is essential. In general, there should be no dismissals due to increased productivity. Any reduction in the establishment of staff should be met by internal wastage, transfers and the curtailment of recruitment, even though planned progress may be temporarily retarded.

« Whenever desirable and possible, a change of job and any necessary retraining should be arranged to avoid transfer to another centre and should such transfer prove inevitable, provision should be made within the framework of regulations relating to the transfer of personnel. »

— *In the absence of any observations, these modified texts of Summaries Nos. 1, 3 and 4 are adopted.*

Summary No. 12 :

« In work study investigations, the full co-operation of the staff and their representatives should be sought. »

Mr. VALDIVIESO suggests that the end of the sentence should, in the French text, read : « ... recherchée et encouragée. »

Following an intervention by Mr. ARYS, the Section adopts the revised version with the following ending : « ... doit être encouragée et recherchée ». (English text : « ... *encouraged and sought* »).

Summary No. 13 :

« 13. It is essential that Work Study personnel should be well trained. If investigations are carried out by inexperienced staff, the benefits of Work Study will never be realised.

« It is clear that a sufficient number of competent personnel be trained in Work Study techniques if tangible progress is to be made. »

Summary No. 2 :

« 2. There must be complete confidence between employees and management. The Administrations endeavour to create an atmosphere of confidence by :

« — explaining to their staff, the meaning of productivity, the reasons for increasing and the means to achieve it;

« — minimizing any disagreeable consequences which may arise temporarily from the changes necessary to increased productivity;

«— having their staff participating in one way or another, in the resulting benefit. »

— *In the absence of further observations, these modified texts of Summaries Nos. 13 and 2 are adopted.*

— The meeting is closed at 12.40 p.m.

Meeting on 28th June, 1960 (afternoon).

Chairman : Sir JOHN BENSTEAD.

— The meeting is opened at 2.30 p.m.

The CHAIRMAN reads the modified version of Summary No. 14.

Summary No. 14 :

« Providing method study and work measurement are efficiently carried out, incentive bonus schemes are a very good means of improving individual performance; they should be substantial if they are to be effective, while safeguarding the standard of the work performed.

« Individual or small group incentive schemes are more commonly used, and this basis in general seems to be the most desirable. On the other hand, it may be considered advantageous in certain circumstances to introduce group incentive schemes. »

Mr. RATTER proposes, in order to avoid misunderstandings, that the English version should be modified as follows :

« ... bonuses should be substantial if schemes are to be effective... »

Mr. GUIBERT thinks that the version : « ... should be substantial if they are to be effective » should be retained.

In Mr. DUNBAR's opinion, too much importance has been attached, in the text, to the group incentive.

Mr. GUIBERT points out, that, e.g. in a marshalling yard, the system of group incentives is the only one that can be applied. This system is well borne out by method studies. On the other hand, a second group incentive system consists in letting the staff participate in the overall results of the undertakings. In this latter system, the conception is quite different, and depends neither on the works organisation nor on the working methods.

Mr. DUNBAR thinks that the first-named of these two systems corresponds to what is known as the team incentive.

The CHAIRMAN remarks that the difficulty appears to spring from what is generally known as the team incentive, and proposes the following modification of the Summary which should avoid any misunderstanding on this subject :

« Individual or small group incentive

schemes, such as they are applicable to a marshalling yard, are more commonly used and this basis, in general, seems the most desirable. » The remainder of the text would be omitted.

Mr. SCOUMANNE (*Belgian National Railways*) points out that, up to now, the group incentive had not been introduced in the marshalling yards of the S.N.C.B. He therefore suggests that the latest text should be amended to read :

« ... such as they are sometimes applied in marshalling yards ».

The CHAIRMAN proposes the adoption of this latest version with this final modification : « ... such as may be applied in marshalling yards... » (*Assent*).

The text adopted is the following :

« 14. Providing method study and work measurement are efficiently carried out, incentive bonus schemes are a very good means of improving individual performance : the bonus should be substantial if the schemes are to be effective, whilst safeguarding the standard of work performed.

« Individual or small group incentive schemes, such as may be applied in marshalling yards, are more commonly used and this basis in general seems the most desirable. »

He then proposes a final Summary No. 16 :

Summary No. 16 :

« 16. As a general conclusion it is accepted that the introduction and widest extension of Work Study schemes is in the interest of all railway undertakings and their employees. They can prove of very great benefit in meeting the special difficulties which confront railways in all parts of the world. »

— *In the absence of any observation, this new Summary is adopted.*

Mr. GUIBERT congratulates the CHAIRMAN on the manner in which he has guided the work of the Section.

— The meeting is closed at 4 p.m.

Meeting on 29th June, 1960.

Chairman : Sir JOHN BENSTEAD.

— The meeting is opened at 9 a.m.

The CHAIRMAN reviews, one by one, Summaries Nos. 10, 11, 15, 1, 2, 3, 4, 12, 13, 14, and 16.

— *In the absence of any observations, these Summaries are finally adopted.*

The CHAIRMAN expresses his thanks to the Delegates for their co-operation and for the excellent spirit which has governed all their discussions.

Mr. MAASS wishes to express to the CHAIRMAN the gratitude of all the Delegates for the perfect competence with which he has guided the work of the Section. (*Prolonged applause*).

— The meeting is closed at 9.40 a.m.

— *The final complete text of the Summaries of Question 4 is reproduced on pages 959 and 960 of this Bulletin.*

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

Enlarged Meeting of the Permanent Commission, at Brussels

(27th to 29th June, 1960).

Plenary Meeting held on the 29th June, 1960

Mr. M. DE VOS, *President of the Association,* in the Chair.

— The meeting was opened at 11 a.m.

The PRESIDENT stated that the ratification of the Summaries adopted in the Sections during the technical sessions was the only item on the agenda.

The GENERAL SECRETARY recalled that the texts of the Summaries adopted in the technical sessions had been circulated to those taking part.

— *No objection was raised during the examination of these texts and the* PRESIDENT *stated that the summaries submitted to the Assembly were therefore adopted.*

— The final text of the Summaries relative to Questions 1, 3 and 4 is reproduced on pages 948 to 960 of the present Bulletin.

The PRESIDENT then addressed the meeting as follows :

« Gentlemen,

» It is fitting that I should, first of all, express our feelings of deferential gratitude to His Royal Highness, the Prince of Liège. His august presence at our Opening Session lent supreme lustre to the celebration of our 75th anniversary.

» The Minister of Communications, in addressing us, in receiving us at the Arts and History Museum and in entrusting his highest officials with the organisation of a reception which he wanted to be worthy of the circumstances, once more manifested his sympathy with, and high regard for, the profession which is ours.

» Gentlemen, we have just adopted important summaries. Last Monday, I predicted a felicitous conclusion of our present intermediate Session. I knew it could not be otherwise as we started out with all the trumps in our hands :

» — the subjects of the discussion were clearly defined;

» — the questionnaires were most carefully prepared by the Reporters;

» — there was wholehearted cooperation on the part of the Administrations consulted;

» — the replies were meticulously collated by the Reporters;

» — the special reports provided precise summaries of the published reports concerning the various questions;

» — the competence and lively interest displayed by the delegates and their assistants was of the highest order.

» It is therefore not with surprise that I can now state that the mission, with which you were entrusted, has been wholly accomplished. I congratulate you and thank you.

» To my collaborators in the Executive Committee, to the Chairmen of the Sections, to the Reporters, to the Special Reporters, to the Secretaries, I pay the tribute they deserve for the value of their respective contributions — without forgetting the English Joint General Secretary, Mr. HARRINGTON, and the Assistant to the General Secretary, M. SQUILBIN. The Secretariat of the Association has carried out a very arduous task with great devotion at all times, inspired by our indefatigable General Secretary, whose name I have great pleasure in mentioning specially. For, in this year of 1960 in which we celebrate the 75th Anniversary of the Congress, M. Paul GHILAIN has completed the 35th year of his office — thus establishing a record which is difficult to beat, and which is only shared by M. LAMALLE, Honorary General Manager of the S.N.C.B., former Professor at Louvain University, eminent author, and our venerable Senior Member.

» I am very grateful indeed to my colleagues on the Organising Commission. They have organized the technical visits and the other events, and have spared no effort in doing so. I hope that these events will take place to general satisfaction. If that is so, the Commission will therein find their reward for their efforts.

» The Ladies' Committee has tried to render the time which our dear companions must spend apart from us as pleasant as possible. I hope it will have succeeded — but even now, I would like to say to them how grateful I am for having so spontaneously offered their assistance which I greatly appreciate.

» Gentlemen,

» Some of our colleagues are leaving already to-day, and I am sorry to have to part from them. I shall have the pleasure of spending another few days with the remainder.

» To all of you, I wish, even now, a happy return to your respective countries.

» Old friendships have been revived, new ones have been formed — would that all the peoples of the world were friends like the railwaymen ! »

The PRESIDENT'S speech was greeted with *prolonged applause*.

— The Meeting was closed at 12.15 p.m.

SUMMARIES

adopted at the Plenary Meeting of the Permanent Commission on June 29, 1960

1st SECTION. — WAY AND WORKS.

QUESTION 1.

The effect of electric traction on signalling and communication circuits, in particular reference to the means of overcoming interference, to provide safety and good communications.

Summaries.

« 1. It is the general opinion of the « Administrations that interference be« tween the substation power feeder « lines and the telecommunications and « signalling circuits does not present any « special problem.

« 2. At D.C. substations, transfor« mer-rectifier sets of the mercury va« pour type are now in virtually general « use. Most of the Administrations use « six-phase or twelve-phase rectifiers. « Filters designed to reduce harmonics « with rectified current are not often « used when the circuits which might « be affected are cabled.

« The equipment of A.C. substations « depends on the frequency. The solu« tions adopted may comprise trans« formers only, or rotary sets.

« In both A.C. and D.C. cases the « feeders are protected by ultra-high « speed circuit breakers. Automatic re« closure is often used, with or with« out automatic testing of the insulation « of the catenary.

« 3. The problem of interference phe« nomena between the traction contact « lines and the telecommunications and « signalling circuits (which are normally « produced by magnetic induction, and « measured by the voltage induced) has « been the subject of calculation by se« veral Administrations. As far as pos« sible, the factors having a bearing on « the subject and the effective current « values both for normal loads and for « short-circuits are being taken into « account.

« With direct current systems in par« ticular, the calculated or measured « current gradients must be taken into « consideration. The calculations are « based on the formula recommended by « the C.C.I.T.T., and in the case of D.C.,

« at the moment of a short-circuit, on the method of equivalent frequencies.

« The values of normal load and short-circuit currents which would be taken into account in this connection are still a matter for discussion. There is, however, a tendency to use, as a basis, the actual load encountered in practice.

« The soil resistivity factor which plays an important part, is still ill-defined and little known, and continues to be the subject of numerous studies. Several parameters have the effect of modifying the depth of current penetration, which may falsify the results obtained from the various measuring methods in use.

« So far only few Administrations have carried out systematic measurements in this sphere, though it would be highly desirable to proceed with such measurements. Along high tension lines which could give rise to inductive effects as well as along railway lines scheduled for electrification, it is desirable that measurements should be carried out in accordance with standardised methods, and with the collaboration of the organisations or Administrations interested in the question.

« 4. The compensating factors which influence the coupling effects vary greatly.

« In some cases of A.C. electrification the use of booster transformers, with or without return conductors, represents an additional compensating factor — it may be necessary in the case of high resistivity in the soil for instance — as it reduces the flow of current in the soil, at the cost of some loss of energy in the traction circuit.

« The use of booster transformers is, however, an additional cost on the railway administration both in capital and annual charges, and they should be considered only after investigating the possibility of modifying the telecommunication circuits to avoid recourse to this method. This investigation, which should take into account the probable development of the telecommunications equipment, can be made only in full agreement with the Administration owning the circuits; moreover, to obtain the most economical and practical solution, collaboration between the two Administrations is essential.

« With D.C. electrification, certain Administrations limit the number of connections between the supporting structures of the catenary and the rail in order to reduce as much as possible the effects of traction current on two-rail track circuits, to give a warning of rail breakage and to reduce corrosion of buried cables and metallic conduits. For this purpose use is made of spark gaps and also earth wires. It is even possible completely to eliminate connections to the rail by continuous connection of the catenary supports.

« 5. It is important that account should be taken of the screening effects which arise from the metalwork in the vicinity of the signalling and telecommunication lines (metallic conduits, long structures and, of

« course, nearby sheaths and rails). The « question of screening effects is, how« ever, extremely complex. These effects « are difficult to measure and, because « of the diversity of the relevant factors « as between one network and another, « it is difficult to interpret the results « of the practical tests which can be « carried out in this respect. The ques« tion of determining the currents in « the conductors (modulus and phase « angle) must be faced.

« Some Administrations have carried « out, or are now carrying out measure« ments in this sphere. So far, however, « the results obtained are few in num« ber, and hardly conclusive.

« The volume of information supplied « on the screening factor of metallic « sheathing is small. The factor varies « with the frequency and with the satura« tion condition of the metallic armour« ing. It is desirable that Administra« tions should carry out tests and « exchange information on the results.

« 6. Among the precautions taken « with a view to limiting the interference « phenomena in groups of overhead « telecommunication lines running along « electrified railway tracks, the following « measures can be named : elimination « of earth returns (this measure is, « moreover, recommended for all types « of circuit); placing the overhead lines « at the greatest practicable distance « from the tracks (though this factor « does not exert a preponderant in« fluence); and mainly, the transposi« tion of the conductors.

« It is important to arrange the lines « in accordance with a carefully studied « transposition scheme, designed to re« duce the transposition intervals. But « even with perfectly regularly spaced « transpositions, various factors which « are unavoidable with the operation of « overhead lines are liable to introduce « unbalance conditions which are, more« over, apt to vary.

« It would be desirable to carry out « supplementary research and studies on « the subject of the sensitivity coeffi« cients and their variations.

« 7. For the installation of telecom« munication and signalling cables along « electrified lines, buried cables are « generally preferred. Some Adminis« trations, however, prefer cable con« duits which ensure a better mechanical « protection of the cables and which, « moreover, contribute to the corrosion « protection of the cables in the case « of D.C. traction.

« The types of cables in use are still « generally provided with metallic ar« mouring. They comprise a lead sheath « and, fairly often in the case of A.C. « electrification, an armouring of steel « tape or wire, although the latter type « may be less efficient. Most of the « Administrations do not attach par« ticular importance to the use of high « permeability armouring.

« The insulation of the conductors is « generally of the dry paper type for « telephone circuits, and of the impre« gnated paper type for signalling cir« cuits.

« The use of aluminium sheathing is « recommended by several Administra« tions. In many cases, too, external « sheathing or coatings of insulating

« materials are provided as a precaution « against corrosion.

« Little use is made, so far, of cables « without metal reinforcement where « the conductors are insulated with plastics such as polythene or polyvinyl « chloride, or with natural rubber, and « where the sheath consists of polyvinyl « chloride or synthetic rubber.

« Except in the case of D.C. electrification, the interruption of the continuity of the metallic sheathing and « armouring is not a widespread practice. In some cases where this is « done, the joints are not bridged by « capacitances.

« With D.C. current, earthing of « sheathing and armouring is not applied « except at one point, because of the « risk of corrosion. On the other hand, « with A.C. current there is nothing to « prevent earthing, as it increases the « screening effect of the sheaths and « armouring.

« 8. The precautions taken against « longitudinal induced voltages consist in « ensuring that these voltages, even in « the most unfavourable circumstances, « remain far below the breakdown test « voltage between conductors, and between conductors and sheaths. The « usual interruptions of the circuits at « the repeaters may be sufficient to reduce these voltages. Intermediate sectionalisation by means of 1/1 isolating transformers may, however, represent a suitable solution. This « measure gives rise to complications « when verifying insulation of the conductors, which can nevertheless be « done by different methods.

« The protection devices in use are « of conventional types : fuses, thermal « coils, overvoltage protection devices, « lightning arresters. The use of rectifiers as a precaution against acoustic « shocks is also reported.

« 9. As a result of the precautions « taken, the disturbances experienced « are very small. In a few cases only « they have resulted in occasional breakdowns or unbalance conditions.

« Little information has been provided on the subject of the noise voltages observed, but these values always « seem to be very small.

« 10. The value of the potential « above earth has not been generally « reported, but it does not in any case « exceed 120 V under normal working « conditions.

« For safety reasons, the staff are « often required to adhere to certain « rules when carrying out work on the « circuits; these rules take into account « the measures taken to reduce the voltages to which the staff are liable to « be exposed. Special precautions may « become necessary if the cables are « placed close to a live catenary. Normally, no special precautions are « taken in the case of signalling circuits, « because of the short length of the « latter.

« 11. The most effective way of « guarding against the danger of electrolytic corrosion (which need only be « taken into account in the case of « D.C. electrifications) is to reduce the « electric resistance of the track as much « as possible, and to insulate the rails

« as effectively as possible from the « soil. It is, however, necessary to en- « sure that the rail-earth potential does « not become dangerous to staff.

« Apart from resorting to cable con- « duits, special sheathing, special tape « wrapping, or interruptions in the elec- « tric continuity of the sheaths and « armouring (passive protection), the « cables are sometimes also protected « by polarized drainage or tapping « (active protection).

« 12. The problems associated with « the working of track circuits differ « for D.C. and A.C. electrifications, res- « pectively.

« The questions of unbalance pheno- « mena in track circuits in two lines « of insulated rails, and of the induc- « tion effects to be expected between a « track circuit and the contact wires « or rails of the adjacent track, would « seem to merit closer studies than has « been the case so far.

« The connection schemes are so « designed as to ensure safety even « under abnormal conditions prevailing « in the traction network.

« The impedance bonds used in the « track circuits are so designed that an « unbalance not exceeding a certain « value (which, incidentally, varies as « between one Administration and « another) between the two windings « does not disturb the working of these « circuits. All the receiver apparatus « used in the track circuits must be « designed to work with particularly « high selectivity.

« It is considered that the systems in « use do not call for special precautions « as regards transient phenomena.

« Overvoltage protection, where this « is deemed necessary, is obtained either « by means of spark gaps or discharge « gaps, or by means of a judicious « adaptation of the equipment (transfor- « mers becoming saturated when the « currents become too high).

« 13. *With D.C. electrification,* the « following types of track circuits are « used :

« — A.C. feed at industrial frequency « (e.g. 25, 42, 50, 60) or, in some spe- « cial cases 83.3 c/s, using induction « relays with two de-phased elements or, « sometimes, rectifier relays;

« — A.C. feed at audio, or higher « frequencies up to 20 000 c/s or with « high tension impulses, obtained by « means of electronic apparatus, using « appropriate D.C. relays;

« — track circuits with coded cur- « rents, using coding and decoding « relays;

« — sometimes, for very short track « circuits, D.C. feed.

« Where single-rail track circuits are « used, a length limitation must be « accepted. Certain Administrations « take further precautions in order to « protect the equipment and to ensure « the proper working of the installations. « Other Administrations regard these « precautions as unnecessary as they do « not enhance safety.

« With two-element induction relays, « the effects of the harmonics of the « rectified current need not be feared. « However, the choice of frequency « must take into account the special « condition where harmonics of the « same frequency can be produced.

« With rectifier relays, the length of the « track circuits must be limited.

« The use of protective devices (fuses « or discharge gaps) varies greatly as « between one Administration and « another.

« 14. *With A.C. electrifications,* the « following types of track circuits are « used :

« — A.C. feed at 42, 75 and 100 c/s « for 16 2/3 c/s traction, and at 83.3 c/s « for 50 c/s traction, using induction « relays with two de-phased elements « supplied from two separate phases.

« — A.C. feed at frequencies from « audio up to 20 000 c/s or with high-« tension impulses obtained by means of « electronic apparatus, using appropriate « D.C. relays;

« — track circuits with coded cur-« rents, using coding and decoding « relays.

« — D.C. feed, using D.C. relays « with special characteristics (e.g. short-« circuit rings or windings), series-con-« nected with inductive elements offer-« ing a high impedance to the traction « current.

« The frequencies of the supply volt-« ages are so chosen as to keep away « from the frequency of the traction « currents and its most important har-« monics.

« 15. The measures taken to avoid « disturbances liable to arise from inter-« ference of the traction current with « signalling circuits other than track « circuits consist in a judicious choice « of the type and voltage of the feed, « and of the type of equipment.

« In particular when D.C. relays are « used, care must be taken to see that « they are not affected by the induced « voltages to which they may be sub-« jected.

« Two-wire circuits are preferred, « without earth connection, and gener-« ally with double-pole circuit breaking.

« 16. As far as the telecommunica-« tion lines are concerned, close adhe-« rance to the Regulations and the « « Recommendations » of C.C.I.T.T. « ensures that both the danger due to « induction effects and the psophome-« tric voltages in the circuits will be « limited to values which allow normal « working. It is, however, always « necessary to compensate with care the « umbalance capacities of the lines, but « the techniques used with cables are, « in this respect, well known.

« Carrier equipments, which are very « much less sensitive to induction, are « moreover being increasingly used for « long distance telephone circuits. »

SECTION III. — WORKING.

QUESTION 3.

Transport on railway wagons of roadlorries and trailers loaded with goods.

Questions arising from this mode of transport :

- **The role of the road-hauliers;**
- **Tariffs to be applied;**
- **Characteristics of the railway rolling stock to be employed;**
- **Installations for loading and unloading;**
- **Use of single wagons, or of sets of wagons, or of complete trains for this kind of transport.**

Results already obtained and possibilities of extending this mode of transport.

Summaries.

The advantage of carrying road vehicles loaded with goods by rail.

« 1. The Administrations in general « consider that the transport by rail of « road vehicles loaded with goods is of « great interest to the railways.

« The Administrations operating to « this formula or who have made trials « of it are generally in favour of « extending it.

« The essential motives for their in- « terest in this formula are :—

« *a*) it is an excellent solution of the « door to door problem;

« *b*) the technical co-ordination of « rail and road brings back long-distance « traffic to the railway and relieves con- « gestion on the roads.

Organisation of the service, part to be played by the road transport undertakings.

« 2. In carrying out such services, « two formulae have been used :

« *a*) service assured from one end to « the other under the responsibility of « the railway;

« *b*) service assured by the road trans- « port undertaking, which hands over the « vehicle to the railway for the journey « by rail.

« The first formula has the advantage « of giving the railway complete control « over the traffic, and assuring direct « contact with the clients, with the pos- « sibility of encouraging them to the « greatest possible extent to make use of « the most arvantageous method : wa-

« gon or the rail-road formula. It is « valuable in particular in those coun- « tries where the railway is authorised « to run road services.

« The second formula leaves control « of the traffic in the hands of the road « transport undertakings for whom the « railway merely provides the rail trans- « port. Above all, it has the advantage « in those countries where public road « transport undertakings are licensed on « a quota basis, of diverting to the rail- « ways part of the road transport poten- « tial in the case of transport carried out « for a third party which would continue « to go by road if the railway would only « carry out transport over the whole run; « it also attracts private transport which, « in the case of the first formula, would « not be entrusted to the railway.

« The possible utilisation of one or « other of these two formulae is there- « fore a function of the ruling system « governing the railways and the roads « in each country, as well as of the pos- « sibilities of collaboration between the « railway and the road transport under- « takings, and the advantage of such col- « laboration for the railway.

Technical questions.

« 3. The chief formulae which have « been used or tried are :

« *a*) transporting an ordinary road « vehicle on a standard type wagon;

« *b*) transporting a special type of « road vehicle, with or without its run- « ning gear, on a standard type wagon;

« *c*) transporting a standard type of « road vehicle on a special type of « wagon;

« *d*) transporting a special type of « road vehicle, with or without its run- « ning gear, on a special type of wagon;

« *e*) combined rail-road vehicle.

« 4. The first formula is obviously the « most satisfactory. It is widely used in « North America, but is very often not « possible in Europe owing to the di- « mensions of the railway loading gauge.

« 5. The fifth formula is attractive, « but raises delicate problems owing to « the difficulty of reconciling the road « and railway techniques and regulations « (weight, dimensions).

« 6. The three other formulae each « have their advantages and drawbacks. « Various considerations affect the « choice to be made between them.

« The loading and unloading of the « road vehicle on the wagon must be « as rapid as possible, so as to speed « up the transport of the goods.

« The amount and cost of the capital « invested in the stock tends to limit « specialisation of both road and railway « stock.

« The cost of the transport leads to « endeavour to have as low as possible « a dead weight for both road vehicles « and wagons, and the greatest possible « load and useful volume, taking into « account technical exigencies (loading « gauge, weight on rail, weight on road). « This generally leads to a preference « being given to road semi-trailers (in « conjunction with automatic centering « on the wagon), the use of which is « being extended on the roads of Europe, « whilst they are almost exclusively used « in America for long distance traffic.

« 7. It is therefore permissible to « think that, in those countries where « the formula of agreements with the « road transport undertakings is adopted « (formula *b* of point 2), it is best to « adopt a system allowing of the use of « a standard type of road semi-trailer « which will only require very slight « modification. This is the third formula which is adopted in the United « States (Clejan), Germany (low-loader « wagon) and France (S.E.G.I. low-« loader wagons and Kangaroo wagons).

« In addition, the use of semi trailers « has the advantage of avoiding transporting the tractor and the road driver, « who remain at the operating centre.

Loading and unloading installations.

« 8. The loading and unloading installations depend upon the rail-road sys-« tem selected.

« Such installations must allow of a « rapid change-over from rail to road « and vice versa, which at the present « time is only assured by self-contained « transfer systems. In this connection, « the use of some system of guiding the « semi-trailers when loading them on the « wagons considerably facilitates obtain-« ing such a result.

« The capital investment must be « limited to the essential minimum « needed to enable all the stations where « it is desirable to load and unload road « vehicles to be so equipped.

« The use of mobile loading ramps « which can easily be moved about and « used with the minimum of alteration « to the station would appear a solution « to be recommended whenever it is « technically possible.

Carrying out the transport
(single wagons or complete trains).

« 9. Sending forward by complete « train has great advantages by giving a « shorter transport time and lowering « the cost for the railway.

« This is the method to be recom-« mended whenever the traffic is suffi-« cient; it involves limiting the number « of stations where such traffic can be « accepted, with the corollary that the « terminal road hauls will be increased.

« 10. Sending forward by single wagon « or groups of wagons meets the case « when the traffic is insufficient to form « complete trains; it allows a great many « stations to be served and limits the « terminal road hauls to short distances; « the wagons must be sent on by fast « goods trains in order to assure that « the transport time remains competi-« tive.

Terminal road runs.

« 11. These services are assured either « by the railway or by road hauliers, « according to the operating formula « adopted. Certain Administrations limit « the length of the terminal road runs; « such restrictions may also be the result « of the road traffic regulations in force « in the country in question.

« In general, the drivers do not travel « with the road semi-trailers carried by « rail, so that it is an advantage to pro-« vide road transport organisations at the « terminal stations. Such organisations « can be set up either by the railway or « by the road transport undertakings.

Tariffs.

« 12. When the railway works the « traffic from end to end, it charges « clients directly a transport rate which « may be either a door to door tariff « (for example the road tariff if there « is one) or the railway rate plus a « haulage charge.

« 13. If the railway is merely providing « ing transport for a road transport « undertaking, it has no direct contact « with clients and charges the road firm « a rate for the railway journey. In view « of the special features of this traffic, « and according to the tariff formula « adopted by most of the Administrations, « tions, who have experience of this kind « of transport, it is recommended to « establish the rate independently of the « kind of goods and base it on the road « costs, taking into account the distance « of the transport, the gross weight of « the vehicle and the competitive position « tion on the route concerned. The « applied tariff, of course, has to assure « a reasonable profitability of the transport « port and to avoid any transfer of « existing railway traffic.

« The tariffs should be profitable to « the road transport undertakings who « regularly send vehicles over a given « journey and thus allow of a traffic « programme being established.

Future prospects.

« 14. In North America, where the « very large railway loading gauge facilitates « litates solving the technical problems « of rail-road traffic, this kind of traffic « is already very extensive.

« The experience of European railways « ways (D.B. and S.N.C.F.), who have « already perfected certain solutions to « the technical problems raised by a « smaller loading gauge, shows that « there is also a potential for such traffic « fic in Europe.

« 15. In any case, we should not « expect to get such traffic to the railway « way in the case of short rail hauls. « The minimum distance to be taken « into account would generally be from « about 300 to 400 km.

« 16. As a result, in the case of « regions which are parcelled up politically « tically as they are in Western Europe, « full expansion of such traffic can only « be obtained with formulae for international « national transport.

« 17. Owing to the same political « divisions, there is a risk of different « solutions coming out for the technical « problems raised by the small loading « gauge. The heterogeneous nature of « the various solutions may well retard « the growth of the traffic; to encourage « such growth it would be desirable for « the railways to co-ordinate their efforts « and adopt a common solution, or if « this is not possible at least only a very « limited number of technical formulae « which will allow of traffic exchanges « between all the countries concerned « and the use of the same terminal « installations.

« 18. For the rail-road formula to « succeed, it is essential for the railway « to assure, in an atmosphere of mutual « confidence, as close a collaboration as « possible with the road transport under-

« takings. Such collaboration may take « very varied forms, such as contracts « made between the railway and the « road transport undertakings, organisa- « tions in which the railway Administra- « tions and the road haulage firms share « in working the combined rail-road « transport.

« 19. The fact that the rail-road « transport formula is favourable for the « general economy justifies on the part « of the Governments the setting up of « equitable customs and fiscal regulation « measures suitable to facilitate its deve- « lopment on the national and interna- « tional plane. »

SECTION IV. — GENERAL.

QUESTION 4.

What steps can be taken to develop and maintain co-operation between management and staff to improve productivity?

What scope is there for work study and incentive schemes?

Summaries.

Part I.

« 1. It is generally agreed that of the « factors contributing to increased productivity, the human factor is the most « important.

« *Enlightened leadership is all-important* because experience shows that a « passive attitude on the part of the « staff can not only retard but even « prevent any increase in productivity « which is otherwise technically possible.

« 2. There must be complete confidence between employees and management. The Administrations endeavour to create an atmosphere of « confidence by:

« — explaining to their staff, the « meaning of productivity, the reasons « for increasing and the means to « achieve it;

« — minimizing any disagreeable consequences which may arise temporarily « from the changes necessary to increased productivity;

« — having their staff participating « in one way or another, in the resulting benefit.

« 3. There should be consultation at « all levels, particularly where changes « affecting individuals are contemplated.

« *Productivity councils* on which the « highest levels of management and *the staff* are represented, are invaluable « in maintaining a good atmosphere and « keeping *the staff informed at an early stage* of the management proposals.

« The success of these councils is « enhanced by the setting up of Committees at lower levels.

« 4. A feeling of security is essential. « In general, there should be no dismissals due to increased productivity. « Any reduction in the establishment of « staff should be met by internal « wastage, transfers and the curtailment « of recruitment, even though planned « progress may be temporarily retarded.

« Whenever desirable and possible, a « change of job and any necessary « re-training should be arranged to « avoid transfer to another centre and « should such transfer prove inevitable, « provision should be made within the « framework of regulations relating to « the transfer of personnel.

« 5. A valuable contribution to « increased productivity is for management to provide and maintain well-« conceived training schemes for all « grades of staff.

« Working conditions must be of a « good standard. Staff will always « respond better if due regard is paid to « their personal welfare.

« 6. Whilst the provision of general « productivity indices is often necessary, « it is very advantageous that the pro-« ductivity of small units such as groups « of staff at local level should be clearly « expressed.

« 7. There should be reasonable pro-« motional prospects and the promotion « schemes should be clearly defined.

« 8. Suggestion schemes are valuable « for the submission of new ideas by « members of the staff.

« 9. The exchange of information in « regard to productivity should be « encouraged. Small teams to visit pro-« jects of common interest would be « advantageous.

Part II.

« 10. There is scope for Work Study « in every activity associated with a « railway undertaking.

« 11. Work Study provides both a « qualitative and a quantitative assess-« ment of the utilisation of equipment « and personnel in terms which can be « universally understood and compared.

« 12. In the introduction of Work « Study the full co-operation of the « staff and their representatives should « be encouraged and sought.

« 13. It is essential that Work Study « personnel should be well trained. If « investigations are carried out by « inexperienced staff, the benefits of « Work Study will never be realised.

« It is clear that a sufficient number « of competent personnel be trained in « Work Study techniques if tangible « progress is to be made.

« 14. Providing method study and « work measurement are efficiently « carried out, incentive bonus schemes « are a very good means of improving « individual performance : the bonus « should be substantial if the schemes « are to be effective, whilst safeguarding « the standard of work performed.

« Individual or small group incentive « schemes, such as may be applied in « marshalling yards, are more commonly « used and this basis in general seems « the most desirable.

« 15. Whilst the provision of finan-« cial incentives is often necessary, « good working conditions and good « management in creating the proper « spirit of understanding are of very « great importance.

« 16. As a general conclusion it is « accepted that the introduction and « widest extension of Work Study « schemes is in the interest of all rail-« way undertakings and their employees. « They can prove of very great benefit « in meeting the special difficulties « which confront railways in all parts « of the world. »

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OBITUARY.

Jean GOURSAT,

Manager of the North Region of the French National Railways Company,
Vice-President of the International Railway Congress Association.

As the recent Enlarged Meeting of the Permanent Commission in Brussels came to a close, we learnt with the deepest regret of the death of M. Jean GOURSAT, Manager of the North Region of the French National Railways and Vice-President of our Association. Always devoted to the work of our Association, it was with great regret that he advised us that he would not be able to participate in this Meeting which marked the 75th anniversary of the founding of the Association.

M. Jean GOURSAT was born at Naves (Corrèze) on the 3rd August 1896.

A former pupil of the Polytechnic and of the National High School of Mines, in 1915, he joined the Colonial Artillery and was promoted in turn, Sub-Lieutenant, Lieutenant and then Captain. His notable conduct during the 1914-1918 war earned him the « Croix de Guerre » with three citations.

When he left the School of Mines in July 1923, he was charged with a mission on the Interallied Commission for the Control of the Essen Mines and Factories.

Placed at the disposal of the Colonial Ministry on the 1st May 1924, he was appointed to a suitable job in Madagascar where he remained until the end of September 1928.

Once again at the disposal of the Mines Administration, on the 1st October 1928, he was allocated to Lyons and put in charge of the Mineralogical Department of this region as well as in control of the technical operation of the P.L.M. Railway.

On the 1st October 1930, he joined the North Company as an Engineer attached to the Central Operating Department, where he soon gave proof of his quality and was quickly promoted in turn Assistant Operating Manager, on the 1st January 1932, Chief Assistant Operating Engineer on the 15th January 1933 and finally Chief Operating Engineer on the 1st January 1934.

When the French National Railways Company was created on the 1st January 1938, M. GOURSAT was given the post of Manager of the Central Traffic Department, an extremely important position at a time when it was necessary to co-ordinate the running of the operating departments of the old companies as a whole and in particular to standardise their respective regulations.

This job, which he carried out in a masterly fashion, was almost completed when the second world war was declared on the 1st September 1939.

During the vicissitudes of this war, M. GOURSAT placed all his energies and the gifts of his great intelligence at the disposal of his country. His patriotism always dictated what course of action he should follow without fear of the attendant consequences.

When France was liberated, the services he had rendered resulted in his appointment as General Secretary of the Ministry of Public Works and Transport, and then General Manager of the S.N.C.F.

He at once embarked upon the restoration of the French National Railways, and the audacity of his outlook resulted in this being extended to cover a modernisation programme, the benefits of which the S.N.C.F. is still enjoying.

The last part of his carrier was passed on the North Region with which he always had a great many ties. He devoted himself to increasing the transport potential of this region of high industrial production, so as to have all the necessary means available, as regards power, capacity and regularity to meet the requirements of its economic expansion. He was in charge of the Lille-Paris electrification, which showed his mastery of all the problems arising in connection with this important changeover in traction.

Finally, he always devoted himself to the task of strengthening in every way the collaboration with the railways of neighbouring and friendly countries.

M. GOURSAT was a Commander of the Legion of Honour, and holder of the King's Medal for Service and the Medal of Freedom.

M. GOURSAT was appointed Vice-President of the International Railway Congress Association in 1946, when the Association resumed its activities after the war. In 1937, he had participated in the Paris Congress as delegate for the North Railway Company. At the Enlarged Meeting of the Permanent Commission in Brussels in 1939, he was a reporter for Question II covering the problems of simplifying the operating of railways. He took part in the Lucerne (1947), Rome (1950), London (1954) and Madrid (1958) Sessions, as well as in the Enlarged Meetings of the Permanent Commission at Lisbon (1949), Stockholm (1952) and The Hague-Scheveningen (1956).

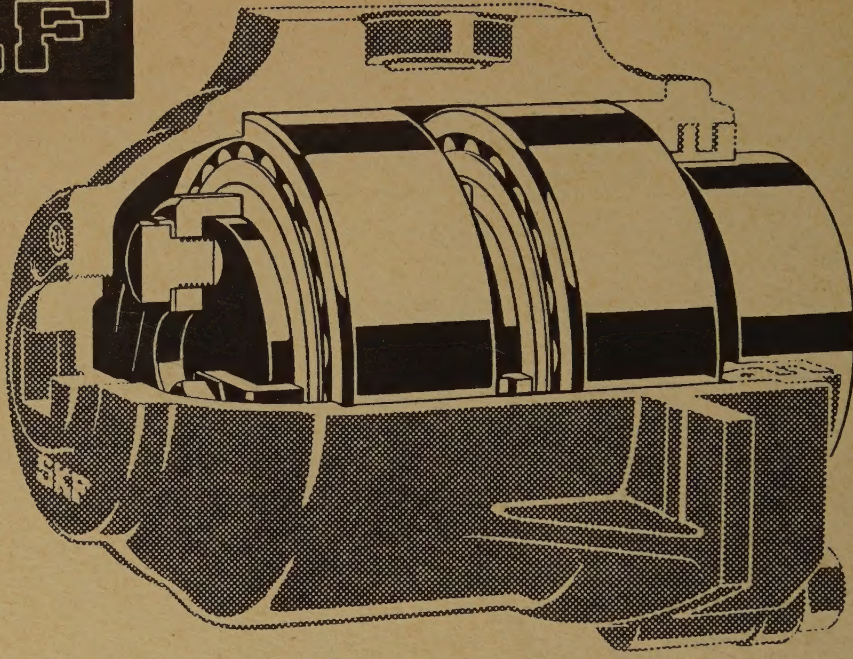
For many years, M. GOURSAT took an active part in the running of the Association. During this lengthy period, very few actions were taken, and very few decisions made without his intervention, if not by his active initiative. In particular, he was the promoter of the creation of the supplement to the *Congress Bulletin* « Electric Traction on the Railways », the idea of which he supported at the Enlarged Meeting at Lisbon in 1949, publication of which began in 1950.

His affable character, his innate sense of business affairs and his vast knowledge concerning railway matters earned him the respect and admiration of all his colleagues.

In the name of the Association, we offer his family our most sincere sympathy.

The Executive Committee.

SKF



THE ULTIMATE AIM IS 100% ROLLER BEARINGS

At a meeting of Nordiska Järnvägsmannasällskapet (The Scandinavian Railwaymen's Association) in Oslo on 5th—6th May, 1959, a lecture was given entitled "Solid or built-up wheels". The following quotation from this lecture was published in the November 1959 issue of the Nordisk Järnbanetidskrift (Scandinavian Railway Journal) :

"Defects which have caused us most trouble in Sweden are hot running with plain bearings, cracked wheel seats, loose tyres, and flats on the tyres. Measures taken during the 1950s resulted in the number of cases of hot running being reduced considerably, from 9.3 goods wagons per million wagon-axle miles in 1951 to 0.6 in 1958. This favourable development was largely brought about by substantial investments in conversions from plain bearings to roller bearings. The ultimate aim is 100% roller bearings.

It was hardly necessary to calculate whether or not this would be economic, since this was self-evident in the light of the following advantages which weigh heavily in favour of roller bearings :

1) The costs arising out of normal hot running and of severe hot running resulting in broken journals and derailments are reduced.
2) Periodic lubrication of bearings between overhauls is no longer necessary.
3) The interval between overhauls of goods wagons has been increased from 3 to 4 years.
4) Wheels fitted with roller bearings have less frictional resistance."

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